TELEPHONE ENGINEER

Vol. I CHICAGO, MAY, 1909 No. 5

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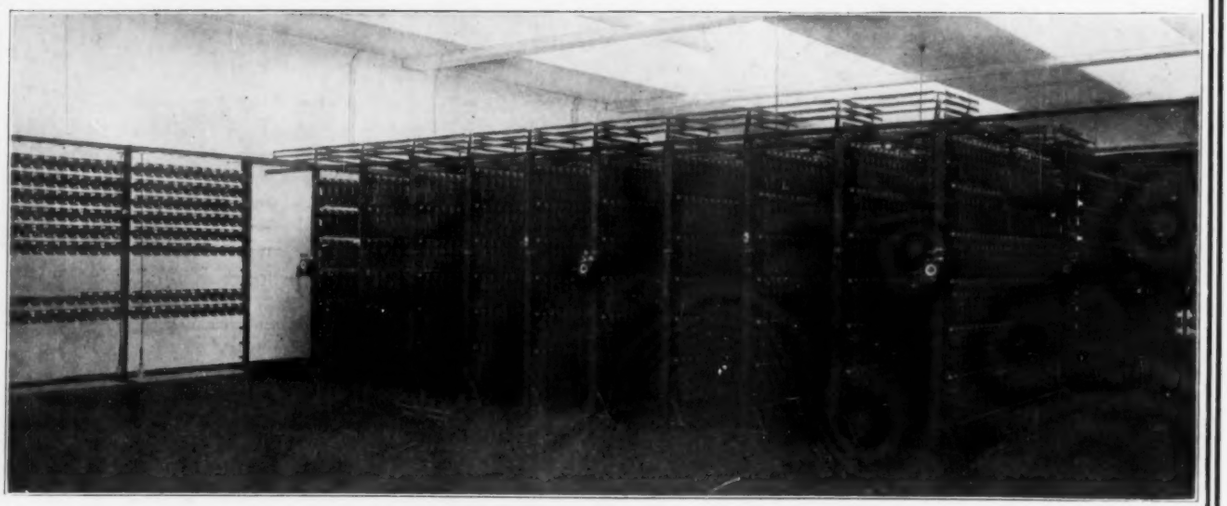

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CHICAGO, MAY, 1909.

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EXTIRPATE THE BUG.

THERE are many excellent virtues in the scheme of measured telephone service, but it has its shortcomings. Without assumption or priori-reasoning we know from experience that perfection in this particular phase of telephone operating has not been attained.

The user of prepayment service receives no guarantee that his call will mean anything to him, should it perchance encounter the private branch exchange.

For example, the calling patron wants connection with "Local 22, Main 587." He is reasonably sure of the latter, but if the called party at Local 22 happens to be out, or particular station busy, the call is lost. The charge in such cases is made because the operator at the private branch exchange made reply. The calling subscriber had no more interest in the private branch exchange than the engineer of a limited train has for the section foreman's shanty on the railroad right of way. The rule of operating companies is inflexible on this point and in large cities the unjust tax to telephone patrons aggregate a vast unearned and trouble-breeding total in dollars.

TELEPHONE ENGINEER uses the measured service of the Chicago Telephone Company, because it has the allurements of economy. We are presumed to pay only for what we get. But if we want to converse with Mayor Busse with reference to the poker-playing proclivities of certain members of the police commission, we call Main 447—city hall, and ask for Local 138—the mayor's number. The line may be tied up, or the mayor is in Charley Murphy's office helping with the 1909 Cub schedule. We have recourse to break even on that attempted interview, because the central operator has made the charge; made it manually because she put up a connection for Main 447. If we want to "chin" with the city hall operator, for our money's sake, we interfere with the traffic! If we flash the central operator and ask for some other city hall number, explaining that no answer came from Local 138, for the inferred reason mentioned, the manager of central exchange will interpose and read us rule 7,649, page 804 of the code. The nickel is lost.

And that's our grievance! We are not wholly different from the two million odd humans in Chicago who are always wanting partial return for the money they spend, whether it has to do with telephone service or not.

If it were unreasonable to require the telephone company to supervise the private branch exchange call it would be different. Toll calls are supervised clear through to the actual called party. The public will not complain if it knows that the private branch exchange call is supervised through to the local station, and it will accept any reply from that instrument and be satisfied It may be the scrub woman on the night shift, but that won't matter.

The private branch exchange is not such a numerous installation after all. It is made necessary to relieve congestion and improve the service. The number of measured service stations is small when compared to all other stations.

The supervision of such calls ought to be a simple matter. The proceeding would be not unlike that which prevails with the supervising of the automatic pay stations. The operator does not take the nickel until she hears the voice of the party called for. In respect to the measured service subscriber and the private branch board the charge should not obtain until an answer came from the called instrument. When we call a certain room in a certain hotel and get no response, we should not be subjected to the prepayment of such avowedly unsatisfactory service. It is worth something, to be sure, to know that the desired party is not in his room, but it is also worth something to know that the man in Aurora is in Chicago—information which can be had in toll service without cost to the originator of the call.

To encourage the measured rate—the fundamentally good practice which large operating companies in particular are striving for—there should be exercised every precaution to eliminate the objectionable feature. To take something from the public without rendering a full account can not be considered in the light of good business.

"TROUBLE."

TELEPHONE systems, being made up of rather delicate parts which are used more or less roughly, are subject to occasional balking spells. These spells are called "trouble." They are reported to the trouble-clerk, who makes out a trouble ticket; and a trouble-man, or "trouble-shooter," is assigned the job of hunting and curing the trouble.

Webster gives a number of definitions, or rather synonyms, for the noun trouble. Among them are affliction, distress, suffering, calamity, grief, misfortune, sorrow, woe, misery, pain.

It is not denied that even the temporary disablement of one's telephone service may be all of these things, and more. But a dispassionate and somewhat critical observer might reach the conclusion, or rather have it thrust upon him, that there is entirely too much "trouble" in the business of furnishing telephone service.

We do not know the origin of the term "trouble" as applied to telephone work. Let us be optimistic enough to suppose that its application was first made in jest, or as a species of shop slang. Trouble is not a pleasant word. It is not even a business-like word. It conveys a sense of worry, of vexation, of imperfect apparatus or work improperly done. When the man comes to fix the telephone, he introduces himself to the householder as "the trouble-man." And the householder thinks—"trouble man! They must have trouble with their telephones all the time!"

As a bit of shop-talk, the objectionable word may be harmless. But the public is rapidly becoming acquainted with many of the shop phrases of public service corporations; and many an unconscious impression is made by such words used indiscriminately. No telephone system is perfect and the subscriber is familiar enough with that fact without forcing upon his attention that "trouble" represents an actual department of the system.

All this is not intended as a preamble to the suggestion of any substitute phrase or word. Surely the invention of a more sanguine term will not be a difficult matter. There must be words in the English language that will cover a multitude of troubles without casting any sinister shadows.

Call it what you please; but cut out the word "trouble."

APPLIED MISINFORMATION.

WE have an Independent Telephone Manufacturers' Association. It has existed for several years and still lingers, for we hold in our hand a report of recent activity—a one-man movement, to be exact; but that makes it all the more easy to recognize, for the association's whole achievement can usually be traced to just one man. The present evidence characterizes the bulk of past performances.

But TELEPHONE ENGINEER will not dwell upon the erstwhile of the association. To be a truly constructive publication we will pass over the has-beens of the business. The I. T. M. A. is godfather to the International Independent Telephone Association and that is quite a large and commendable thing in itself, because the I. I. T. A. requires some funds now and then, and then, again. It has been several years since it spread a report of any kind. If we are impatient at the lack of achievement of the International Association it may be something chronic with us, but we can't help that. There may be good cause for the present gum-shoe campaign—a reason apparent only to the sponsors, who should be satisfied even if we are not.

We certainly are not. We want particularly to know how many simon-pure, non-Bell companies there are in the United States. The International Association's international function is waived—just the plain old U. S. A. We should get such information at International headquarters, but the data is confusing.

The only compilation that has ever been made fixes the grand total of independent companies in the United States at considerably less than 12,000. The American Telephone & Telegraph Company's annual report says it has connection with 7,700 independent companies. TELEPHONE ENGINEER believes there is no permanent listing of so many as 10,000 non-Bell companies anywhere on earth. When the Bell claims connection with 7,700 of them, shouldn't a publication advocating competition in the telephone business show some little concern in a matter so vital? Shouldn't the Telephone Manufacturers' Association insist on an audit, or a round-up or something? Will not the 2,300 untainted please hold up their hands?

It wouldn't be so bad had the Bell company left a loop-hole somewhere, but it is set down for a fact. There has been some snashing at snarl-headquarters, 80 Wall, but there is no rebuttal which rebuts. To make it worse, the Southwestern Telephone & Telegraph Company alone "maintains relations" with 575 sub-licensees, representing more than one-third of its entire subscriber stations. Where are the independent up-set figures? Who is the custodian of facts concerning independent telephony? To merely believe there are more than 15,000 independent companies, big and little, doesn't make it so, and yet we believe that many exist. It is wrong to be denied the fact

when so much money is spent to maintain a central clearing house for such information.

Why, it was only a little while ago when Mr. Critchfield, of the International Association, declared that within a radius of 500 miles of Chicago were 1,300,000 independent telephone stations clamoring for Chicago connection. Isn't it evident that there are high-pressure tendencies to be run to earth by the statistician of last resort? Where's the dope-doctor?

OUR PRIZE CONTEST.

LAST month TELEPHONE ENGINEER inaugurated a five-month contest for telephone men and laymen on the subject of educating telephone users to a civil treatment of each other. The conditions of the contest, and the prizes offered for successful solutions of the problem, will be found elsewhere in this issue.

Let us make it clear from the beginning that the contestant for these prizes, whether telephone man or layman, writer or thinker, has no easy task before him. Even to attempt a complete classification of all the breaches of etiquette committed by the average telephone user involves considerable thought. The fact that the majority of the acts of discourtesy peculiar to the telephone using public are committed all unconsciously adds difficulty to the work; for it is obvious that the object of our educational effort must be brought to a realization of his shortcomings before he can be expected to remedy them. Furthermore, as the operating company has no control over the actions of its patrons, so long as they break no legal or technical rules, the process of changing his ways must be by moral suasion—a labor of love, as it were. And the public, as a general rule, does not care to be educated. It dislikes to be told that it is misbehaving.

Whoever solves the problem will have to know human nature. He will have to find a way to make telephonic courtesy a thing of vital interest to every user. He will have to devise a mirror wherein each telephone patron can see himself as others see him.

It is a difficult subject; but telephone men are accustomed to difficult subjects, and most of them have already expended some thought on this matter. Send in your ideas.

LEGISLATIVE BOMBAST.

UP IN Minnesota a legislature has been innoculated with the dope which says competition in the telephone business is wrong. E. T. Young, a former attorney-general of that state, has had the largest hypodermic and should be disinfected, formaldehyded and sterilized. E. H. Moulton, the telephone Jim Hill of the Northwest, is opposing some of Mr. Young's bunk. Mr. Moulton cites some figures on Denver, where independents have signally failed to obtain a franchise. In his argument to refute the statements that dual systems were an unnecessary waste of energy and capital, Mr. Moulton confesses to a duplication of stations as high as 13 per cent. The Tri-State company has some energetic solicitors. But even with this abnormal duplication it is pointed out that half the subscribers, even with a single system, would require two instruments, which brings duplicated stations b.ck to 6½ per cent. We are jealous of this particular feature of telephone development. When the fraction grows larger there will be better times in the telephone business. Two telephones are not a nuisance. The public will find this out when two orders come in over two lines at the same instant.

In Denver the rate is put down in the book exactly as it is in Minneapolis, but it works differently. Ten years ago there were 2,500 instruments in a single system in Minneapolis. Today there are 33,000. During this growth the rates have been reduced, the service improved. Competition always does this. In Denver, calls are limited to fifty. Excess calls are two cents each. A patron in Denver will pay $78.22 for the same amount of service that he can buy in Minneapolis for $36. And the service will be better in Minneapolis. In Colorado the toll for long-distance service, 200-mile haul, is $1.75. In Minnesota it is 74 cents. The discrepancy in these rates are in favor of the public where competition exists and in favor of Mr. Young where it does not. Take your choice.

But W. M. Hubbard of the Zenith Telephone Company, Duluth, who also figured as a spokesman before the legislative committee, representing an independent company, says there are 50,000 independent stockholders in his state. His estimate must be an exaggeration. Presuming 2,000,000 people live in Minnesota, that would put a stockholders' certificate in the hands of every fortieth person. On the basis of five to a family, every eighth man would be part owner of an independent telephone system.

CO-OPERATION OF MANUFACTURERS.

THERE should be an American Association of Telephone Manufacturers with objects to promote closer business and social fellowship between the manufacturers of telephone apparatus; to advance and better the engineering and commercial practices incidental to such manufacture and sale; to collect and disseminate statistics and information—and to get somewhere.

There are numerous instances where other manufacturers have come together to promote industry in lawful manner. The telephone business is not unlike any other. The jealousies which exist among makers of telephone apparatus are based upon personal rather than business reasons. The membership should consist of classes with graded entrance and transfer dues—a member belonging to two or more classes to pay the dues for each class. No one should be barred and everybody eligible should belong.

There would come great economics from such co-operation. The dissemination of information regarding foreign apparatus; export conditions; trade conditions. The adoption of certain standards in parts; the affiliation with the Manufacturers' Club; reciprocal trade; control of publicity expense; uniformity of cost accounting; freight classification, etc., etc.

From the beginning of things competitive in manufacturing, we have contended that the consumers' price of telephone apparatus has been too low. It is unpardonable for a manufacturer to make a Class Z telephone. To inflict some of the junk upon an unsuspecting public and know that that same public is attempting to secure service is a high crime. There should be more Class A stuff with a price in harmony with it.

But organization on a modern plane would be remedial. To be broad enough to include all manufacturers—the big and the little—the manual and the automatic—would be a far step in the right direction. Nothing would be quite so favorable to the complete success of such an organization as its social features. The time is propitious to get together.

The Country Doctor and the Telephone

By M. S. Allen

THE role of country doctor has always been an interesting one, but it has always been an exceedingly difficult one, with many hardships and few rewards outside of the friendship of the families attended. As conditions in the open country have improved, however, the country doctor's labors have been lessened even though his rewards may not have been increased in like ratio.

A few years ago the country doctor settled in a small town where a practice was assured because there was no one else to aid the afflicted. Usually there were a few families who could afford to pay for medical attention, but there were many more who had little money or property and who could pay small fees only by denying themselves the necessaries of life. Into such a community came the young physician, and his life-work began in earnest. Calls came slowly at first, but ever faster as his skill became known, and where one horse and buggy had been more than enough to make his calls, two were necessary, especially in the winter and the spring when the roads were heavy.

Communication was difficult, and when there was an accident or some one was taken suddenly ill, the only way of summoning aid was by harnessing a horse, and driving or riding miles, perhaps, for a doctor who might be at home or who might be equally far away in another direction. When he was found, it mattered not how tired he was, what time of night, how bad the weather; he must jump into his buggy and hurry to the bedside, sometimes reaching it too late to be of service. This is a phase of country life which has kept many people living in cities when they would have preferred life on a small farm.

In these days a factor has been introduced into country life which has done a great deal to relieve this isolation, and to bring the dwellers in the open country into closer touch, not only with the doctor but also with his neighbors and with the people with whom he does business. That factor is the telephone, and the first people to realize its possibilities were the country doctors. All over the south there are doctor's offices, with from one to ten telephone lines radiating from them, with any number of telephones from one to twenty-five connected to each. In many cases these telephone lines connect with no exchanges or long distance lines, the only purpose they serve being to afford their owners the privilege of talking with one another or to summon aid in emergencies.

When several such lines center in a doctor's residence, he usually has some kind of a switchboard, so that he can connect any of the lines together, thus bringing all the people on the various lines into closer touch. The lines are operated in two ways. One is where the doctor himself builds the lines and furnishes the telephone, renting them to his patrons, on the same principle as a city exchange is operated. This plan frequently results in the doctor's finally operating a telephone exchange with several hundred stations, necessitating the employment of operators and a man to take care of the accounts, switchboard, and so forth.

The other, and usual plan is where the people themselves get together, organize a mutual company, build their own lines, install their own telephones, and terminate the line in the doctor's office, where he installs a switching device, charging the people on the lines a nominal sum of twenty-five or fifty cents per month, each, for connecting the lines together. Frequently the doctor himself is instrumental in getting such a scheme started, and, acting as the agent for the telephones, sells them and the line material to the people building the lines, making a commission which is a welcome addition to his income.

Where such a system exists the beneficial effect, not only upon the community at large, but upon the country doctor also, can hardly be expressed. No matter how far from his office he may be, he is always in touch with it, and can be reached in less time than it takes to saddle a horse. Often he can prescribe for his patient, saving himself a visit, and always in case of accident, can give advice which perhaps will save a life which would have been lost had he not been located so quickly.

Good roads make the practice of a country physician very much easier, and enable him to extend it to the more remote parts of the district in which he lives; but they come slowly at great expense to the community, and only the main arteries are first rebuilt, leaving miles of side roads in as bad condition as ever. Rural free deliveries, that bring him closer to the great centers of life and industry, and to those with whom he comes in contact in a professional way, also come slowly, and extend along the highways, leaving the byways almost as far off as before. The junction of several roads with a rural free delivery route, with a score of mail boxes perched on posts with only one or two houses within view, is a common sight these days, and indicates that the owners of the boxes have to come several miles for their mail.

The telephone is the agent which most tends to increase his practice and his income, to make his calls, and to save his time and the wear and tear on himself and his teams. How much simpler it is for him to call up his patients ten or fifteen miles away and learn whether a change in their condition makes a visit necessary, than to drive that far to learn the same thing! Even if there is not a telephone in the home of every one of them, there is one in the vicinity of each from which the doctor can be notified of his patient's condition and called if a change makes it necessary.

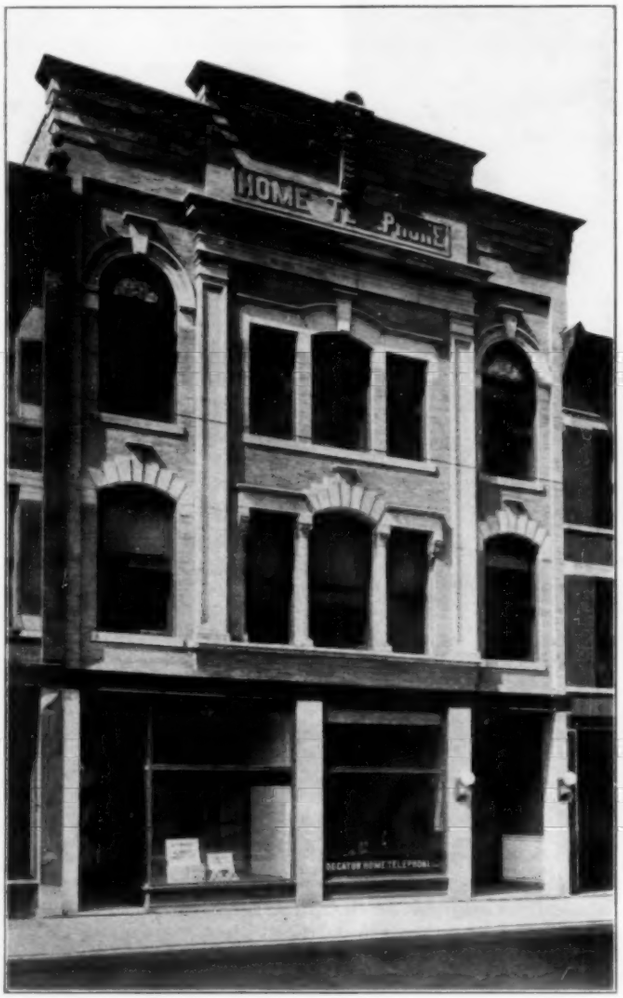
Unlike good roads, its costs little money to build telephone lines, and, unlike rural free deliveries, they may be extended along highways and byways, along good roads, across fields, over hills and streams. They are flexible, they are cheap, they give good service, and they are always ready, day or night, to perform their duty. Once connected up they require no further attention save to renew the batteries once or twice a year, and to keep the lines clear. Their construction is so simple that any group of farmers can build them. Poles, particularly in the south, can usually be cut on the farms, and can be distributed and set into the ground at slight expense. The wire, brackets and insulators for a mile of metallic circuit, which will give the best service, costs approximately only $15 per mile, while the best telephone instruments with all the material necessary cost approximately only $14 each.

Decatur's New Automatic System

By Henry M. Butterfield

ON July 1, 1907, Dr. J. W. Collins, of Lincoln, Ill., purchased from C. S. Hankins the Macon County Telephone Company. With Dr. Collins, who at that time was president of both the Central Illinois Telephone & Telegraph Company, of Lincoln, Illinois, and the Mount Pulaski Telephone Company, were associated C. B. Cheadle, of the Tri-City Telephone Company, of Clinton, Iowa, the Dixon Telephone Company of Dixon, Illinois, and the Inter-State Telephone Company; and also A. G. Hawley, of the Tri-City Telephone Company of Clinton, Iowa, and the Dixon Telephone Company of Dixon, Illinois; and P. E. Kuhl, cashier of the Lincoln National Bank and treasurer of the Central Telephone & Telegraph Company of Lincoln, Illinois.

At the time of the transfer, the Macon County Telephone Company was operating the exchange in Decatur, together with some hundred farmer line subscribers; and although toll connections were afforded throughout the county, none of the connecting lines were owned by this company. The Macon County Telephone Company was not a successful concern, giving a rather indifferent service to about 1,000 subscribers. But the prospect for an up-to-date telephone company was very promising, as Decatur is a well built and growing city of some 35,000 people, located in a very rich and fertile agricultural district and possessing considerable wealth in itself.



New Brick and Stone Exchange Building of the Decatur Home Telephone Company, Decatur, Illinois. The Building was Designed Especially to Accommodate the Company's Automatic Equipment.

Physically the Macon County Telephone Company was in very poor condition, the only part of the outside plant that could be used for any length of time being the underground conduit system. This was rather incomplete and inextensive, while the central office equipment was on its last legs. It was with no idea of operating the existing plant that Dr. Collins purchased the Macon County Telephone Company, but merely to secure whatever good will it might be able to transfer and to obtain a clear field for the construction of a new plant.

With the exception of the above mentioned underground system, no part of the old Macon County Telephone Company has entered into the construction of the new plant. Even the old name was discarded and the present company became known as the Decatur Home Telephone Company.

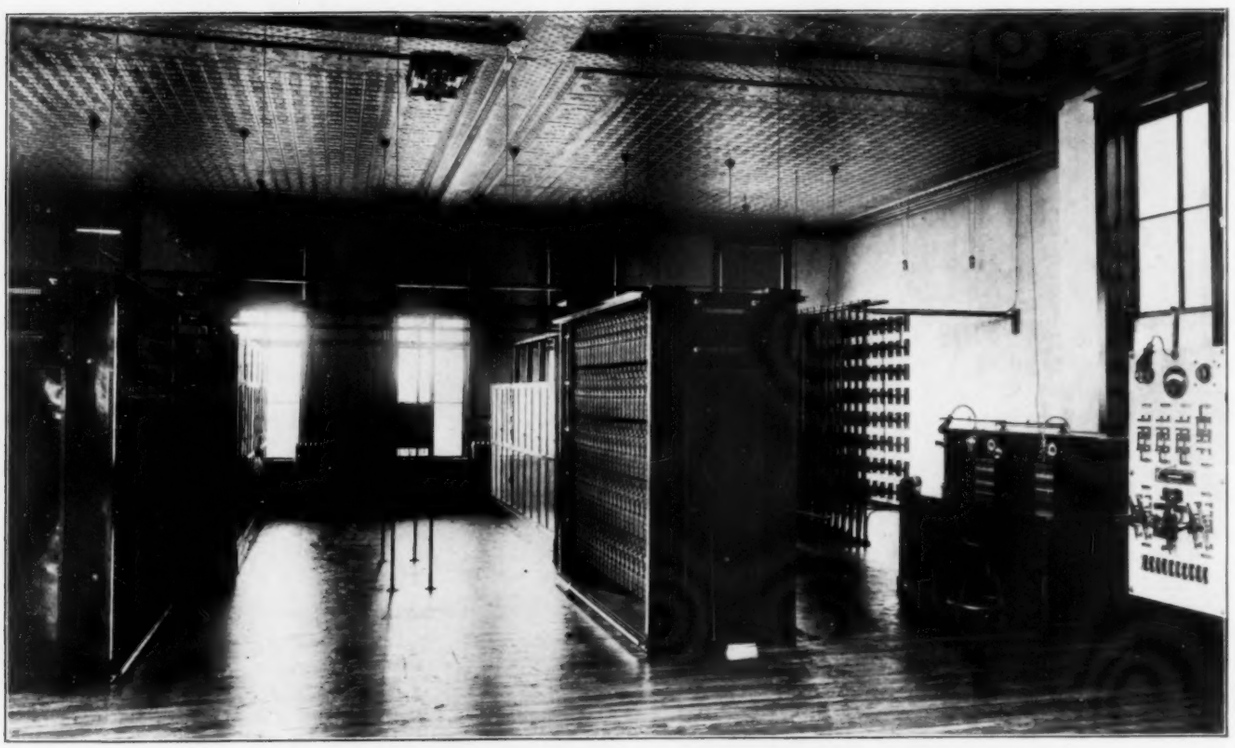
The new organization began with an authorized capital stock of $300,000, secured by first mortgage bonds bearing six per cent interest. In the sale of securities, no difficulty whatever was experienced as in almost every instance the purchaser took $5,000 worth of bonds. The subscription list of bond holders presents the signatures of men of wealth and standing, not only in Decatur, but throughout central Illinois—men who will be able to further the best interests of the company by their position, influence and means. In connection with the financial condition it might be well to add that the capital stock has been increased to $500,000, of which $300,000 has already been paid in; and arrangements are being made to place an additional $100,000 to take care of some extensions, which are to be made in the near future. The company is controlled by a board of nine directors.

In August, 1907, work was begun on outside construction under the supervision of Mr. L. J. Wylie, superintendent of construction of the Decatur company. A lot, 40 by 152 feet, was purchased at this time but nothing was done further towards the erection of the building until July, 1908, at which time the type of central office equipment had been decided upon.

In the meanwhile, Dr. Collins and Mr. Cheadle had carried out a very thorough and extensive personal investigation of the larger operating automatic telephone exchanges throughout the central West. They made a special effort to get the opinion and sentiment of the telephone using public toward automatic equipment without the knowledge and assistance of the operating

or manufacturing company. In such a large percent of cases was the verdict favorable to automatic service that it needed but the showing of the automatic operating companies as to the actual cost of maintenance and repairs to convince them that this type of central office equipment was what they wanted.

Therefore in August, 1908, the company placed an order with the Automatic Electric Company, Chicago, for an automatic telephone exchange of 1,500 main lines, to be of the latest central energy two-wire type and of an ultimate capacity of 5,000 lines. The central office equipment comprised 1,000 straight lines and 500 four-party lines, capable of operating 2,000 telephones. There were also included in the order, one one-position information and booth supervisor operator's desk, one two-position wire chief trouble clerk desk, and a four-position toll and farmer line board.



Switchboard and Terminal Room, on the Third Floor of the Decatur Home Telephone Company's Exchange.

The building, which was specially designed to accommodate this equipment, is 40 by 80 feet in size and comprises three floors and a basement. The front of the building is finished in Roman pressed brick and Bedford stone, while the side and rear walls are built of vitrified brick. The entire third floor is devoted to switchboard. Here is installed the main terminal rack, automatic switchboard, power board, charging machine, harmonic ringing machine and wire chief's desk. The toll and farmer board, which is also located on this floor, is situated in a room by itself in front and at the right.

The switchboard room is finished (and this is true of the whole building) in quartered weathered oak, with hard maple floors. Above the baseboard a hard plaster finish representing tile work extends up for a distance of four feet and is topped with an oak moulding which separates it from the rough stucco finish of the remainder of the side wall. A light grey metal ceiling finishes off the room very nicely; and as the front and rear windows are aided by five windows on each side, each 4 by 10 feet, no skylights are necessary.

On the first floor are the offices of the telephone company, and it is evident to even a casual observer that some time and care were expended in the design and arrangement. Tile floor and weathered oak wood work, with the same finish carried out in the office fixtures and information desk, the deep red wall and tinted metal ceiling, produce a rich yet tasteful effect. Two long-distance booths are located in the front office, large, roomy and best of all, well ventilated.

The basement contains the storage battery at the front and left, leaving a large room for the storing of telephones and small supplies and affording as well an ample workroom. In the rear of the exchange building is a one-story brick storeroom and warehouse for the larger and more bulky supplies and material.

The second floor is divided up into ten offices for renting purposes. These rooms are very desirable, as the exchange building is well located as regards the business district of Decatur, and being new and modern are without doubt the best of their kind in the city. As an investment, this is well worth considering as the rental from this floor will pay five per cent on $35,000, which represents the total cost of the building.

As a telephone plant, the Decatur exchange will compare favorably with any in the country, as it represents all that is best in modern telephone practice. It has underground conduit sufficient for all growth within the next fifteen years. In three directions the underground system extends to the city limits—a distance of at least two miles from the exchange building. In the

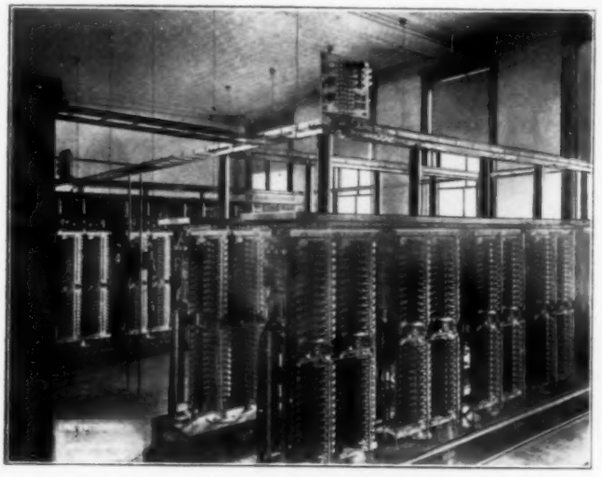
250,000 duct feet of conduit installed in Decatur by the Home Telephone company, McRoy clay duct has been made use of for the most part. That the underground system is elastic and well arranged is evidenced by the fact that 215 manholes have been provided.

Practically no additional cable will be necessary for at least five years, as 3,600 pairs are brought into the exchange building and terminate on the main rack. These 3,600 pairs are made up of 18 200-pair ten-point No. 20 gauge cable, all new and uniform. The cable lay-out comprises 120,000 feet of underground and 80,000 feet of aerial cable.

Multiple distribution prevails throughout. Frank B. Cook's terminal cans, type T-19, with wooden tubular fuses, are used at every distributing point. In very few places does the old type of cross-arms and bare wire construction prevail, and where it is unavoidable No. 12 copper is used. Drops and bridle are all made of No. 16 copper duplex. That the appearance of the subscriber's property is an item worth considering to the company is shown by the fact that "Universal" knobs are used entirely for fastening drops to building.

In the exchange building, Frank B. Cook's main frame, with No. 10 protectors mounted 150 pairs per upright, has been installed by the Automatic Electric Company as a part of the central office equipment. The Decatur Home Telephone Company has effected a very neat installation, in terminating its line cables, by using 200 pairs red and blue wool cable. As constructed, each upright supports a cable and at every cross channel 25 pairs are taken off to the terminal block in the rear.

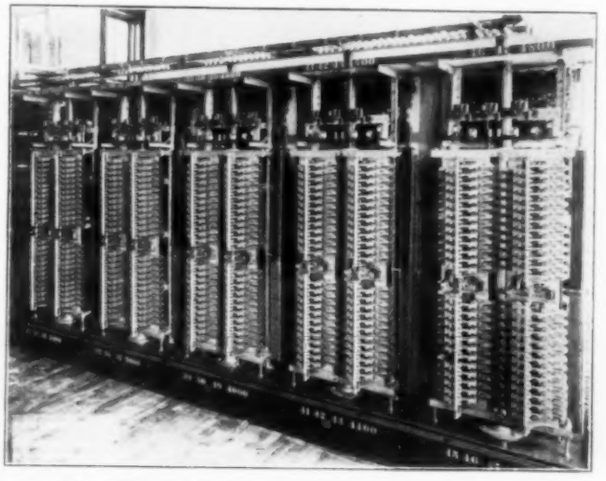
As mentioned above, the central office equipment is a central energy two-wire automatic switchboard. Central energy automatic switchboards have been built for a period of three years, but the two-wire type is very new, this being the third installation of its kind. In the general arrangement, design and construction a great similarity exists between the appearance of the two-wire and three-wire equipment, the same flat Keith type line switchboards with Strowger connector switches mounted



General View of Switchboards, Decatur Home Telephone Company.

in the rear, 100 lines to the unit, prevails. The trunking switches in this case, first and second selectors, are arranged a little more conveniently and require a little less room than formerly; but otherwise the appearance of the switchboard remains the same.

Two sets of Electric Storage Battery Company's type F-5 batteries in F-9 lead lined tanks have been installed, twenty-five cells in each set. For charging these batteries, in addition to the Holtzer-Cabot motor generator set, a mercury arc rectifier has been put in as a part of the power plant equipment. This arc rectifier is of the General Electric Company's manufacture; but instead of being installed on a slate slab with pipe supports, a panel of pink marble of size and pattern to match the power board has been furnished by the Automatic Electric Company and is mounted between the two regulation panels of the power board. This makes a harmonious whole pleasing to the eye with no uninviting comparison forced upon the observer, as has been the case in some former installations.

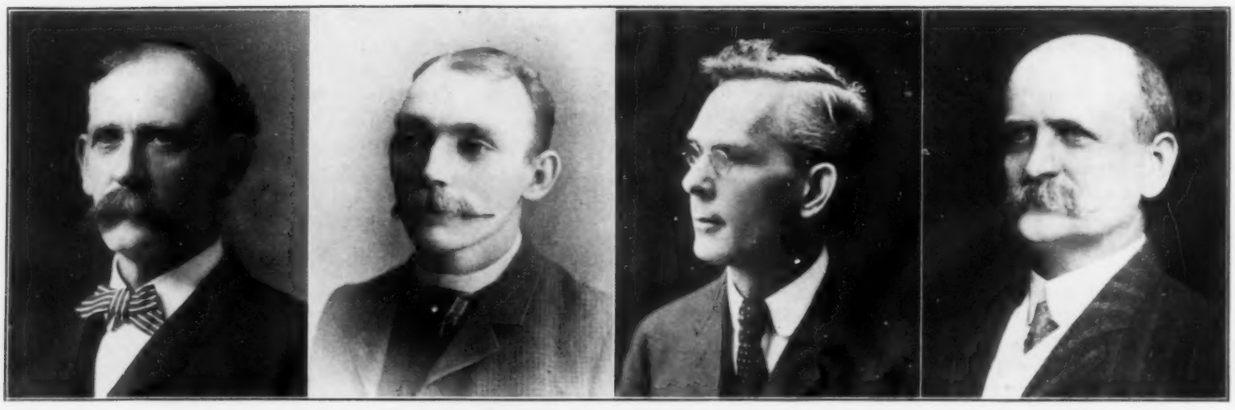


View of Party Line Switchboards, Decatur Home Telephone Company.

On the ceiling, in the center of the switchboard room, is located an oak panel board, upon which eight miniature lamps and two bells are mounted. This telltale panel operates the pilot lights and audible alarms, in connection with the heat coils of the main rack, the battery fuses of the switchboard, and the supervisor and release trunks of the automatic switches. There is also another alarm system, which operates in connection with the switches and fuses of the power board and is therefore placed on the wall near the power board, that makes it impossible for a fuse to blow in a power or ringing circuit or a switch to be left open without attracting the switchboard attendant's attention to the trouble. This system of alarms not only helps in the location of trouble but also makes it impossible for trouble to be overlooked.

The automatic two-wire telephones are much more compact and of fewer parts than the three-wire type. In the straight line telephones, the push button is entirely dispensed with, as automatic intermittent ringing is made use of in two-wire exchanges. In party line telephones, though the push button is adhered to, it is only made use of in signaling between parties on the same line. The automatic two-wire desk telephone is made up as are the manual, with ordinary standard and base. The automatic calling device, a mechanism some three inches in diameter and one and one-half inches deep, is mounted in front and at the top of the base, and so arranged that by loosening three screws it can be instantly removed without unsoldering a wire or removing a single clip.

Having Decatur's interest at heart, the Decatur Home Telephone Company has gone to the trouble of

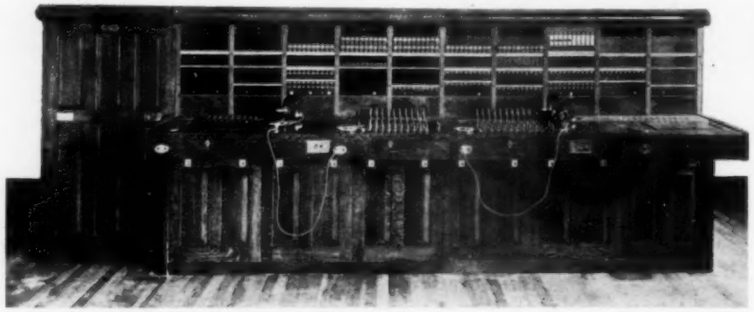


Dr. J. W. Collins, President C. E. Akers, Vice-President. C. B. Cheadle, Secretary. P. E. Kuhl, Treasurer.

installing in the central office equipment some special apparatus for handling reports of fires. Though each of the four fire stations has an automatic telephone, a small manual telephone of the hotel type, manufactured by the same company, with loud ringing gongs, has been installed, not as an extension to the main telephone but on a separate line. These four lines enter the main office and at the main rack are bridged together and carried on into the toll board as a single pair which terminates in a key at the No. 1 toll position. This double throw key has a ringing current on one side and the operator's set on the other, and is used only in case of fire.

An automatic subscriber in reporting fire calls "O." As soon as the operator is notified of a fire, it is her first duty to push the button (one of which has been installed for each "O" trunk), in connection with that particular trunk, so that the calling subscriber cannot release until the switchboard attendant has verified the subscriber's statement as to the number from which the call originated. This precludes all possibility of false fire alarms. The operator does not, however, wait for the switchman's check, but throwing down the fire station key rings all stations at once and reversing the key reports the alarm as given her by the subscriber. This system gives rapidity of service, prevents false alarms, and saves the firemen confusion and loss of time. At present, in the fire stations, as any telephone call may be a fire alarm, it is necessary for the men to hitch the horses to the engine and assemble themselves in their places every time they are signaled over the telephone, even though it may be an ordinary business or social call.

At the time of the cut over the Decatur Home Telephone Company in reality had two exchanges in operation, for it was not necessary to cut the manual exchange dead before beginning service on the automatic. With the exception of a bare 100 telephones, the change of service was rather a cut in, than a cut over, as the new system was new from the main racks in the central office to the binding posts of the automatic telephone. No old poles, old drops, or old inside wire were made use of except in rare cases. When all telephones had been installed and tested through the automatic switchboard, it was only necessary to pull the toothpicks from the rack and without cutting a wire or making any other change, 1,500 subscribers had access to automatic service; and so thoroughly had the work of installation and testing been done that from the start, without a hitch, the best of service was afforded to the subscribers of the Decatur Home Telephone Company.



Toll and Farmers' Line Board, Decatur Home Telephone Company.

As stated above, the men primarily responsible for the organization and development of the company's business are Dr. J. W. Collins, of Lincoln, Illinois; C. B. Cheadle, of Joliet, Illinois; P. E. Kuhl, of Lincoln, Illinois, and A. G. Hawley, of Clinton, Iowa.

Dr. Collins, who is president and general manager of the company, reorganized and built up the business of the Central Illinois Telephone & Telegraph Company of Lincoln, Illinois, which has had a most successful career. He is also the president and largest owner of the Mt. Pulaski Telephone Company, of Mt. Pulaski, Illinois, and it is due in very large part to his wisdom and experience in the telephone business and careful application to the discharge of his duties, that the company has met with such signal success up to the present time.

C. B. Cheadle is the secretary of the company and is also secretary of the Tri-City Telephone Company of Clinton, Iowa, and of the Dixon Home Telephone Company of Dixon, Illinois, and vice-president of the Inter-State Independent Telephone & Telegraph Company, with headquarters at Aurora, Illinois. He has had very large experience in the organization and financing of telephone properties, and was for several years, and until his duties became such that he could no longer serve, secretary of the Illinois Independent Telephone Association.

P. E. Kuhl is treasurer of the company and is cashier of the Lincoln National Bank of Lincoln, Illinois, and has been prominently identified with the organization and development of the business of the Central Illinois Telephone & Telegraph Company of Lincoln. He is a prominent and influential citi-

zen and conservative banker, a most careful and conscientious man.

A. G. Hawley is the president and general manager of the Tri-City Telephone Company of Clinton, Iowa, and is general manager of the Dixon Home Telephone Company of Dixon, Illinois. He has had large experience in the construction and operation of telephone properties, and the laying out of the plans and execution of those plans in the construction of the property of the Decatur Home Telephone Company is due in large part to his untiring efforts and zeal in the business. He is a member of the voting committee of the company.

Other members of the board of directors and voting committee of the company are W. C. Durkes, cashier of the City National Bank of Dixon, Illinois, and treasurer of the Dixon Home Telephone Company; George S. Connard, cashier of the Citizens' National Bank of Decatur; T. L. Blackburn, president of the Decatur Bridge Company of Decatur; C. M. Hurst, president of the Chamber of Commerce, and of the hardware firm of Morehouse & Wells of Decatur; C. E. Akers, retired merchant and capitalist, and prominently identified with the National Bank of Decatur; T. T. Beach, prominent lawyer and capitalist of Lincoln, Illinois; H. S. Beckemeyer, general merchant and capitalist, Mt. Pulaski, Illinois; and George B. Carey, retired merchant and capitalist of Joliet, Illinois.

Others prominently identified with the company's business as stockholders are D. S. Shellabarger, president of the National Bank of Decatur; J. M. Brownback, cashier of the Millikin National Bank of Decatur; Theron and Frank Powers, capitalists and representatives of the Powers Estate of Decatur, Illinois; Robert Muehler, president of the Muehler Manufacturing Company of Decatur; E. P. Irving and W. E. Surface of the Faries Manufacturing Company and the Walrus Manufacturing Company of Decatur, Illinois; A. P. Armington, cashier of the Dixon National Bank, Dixon, Illinois; William McCormick, cashier of the Bank of Emden, Emden, Illinois; L. K. Scroggins, president of the Farmers' Bank, Mt. Pulaski, Illinois; L. B. Stringer, democratic candidate before the legislature for United State Senator from Illinois; C. E. and W. J. Gullett, florists, Lincoln; J. S. Haller, real estate dealer; Dr. H. B. Brown, a prominent physician of Lincoln; Frederick Trapp, representative of the Lord Scully Estate, Lincoln; and many others of like prominence.

How to Read Telephone Circuit Diagrams

By David S. Hulfish

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LESSON V.

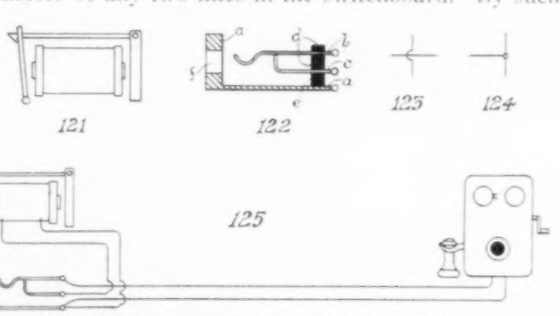
THE reading of the more complex switchboard circuit diagrams must be preceded by a study of the principal symbols used. A knowledge of the methods of constructing the symbols is desirable to assist in the interpretation of any unusual symbols which may be met, and some knowledge of switchboard principles and construction is necessary to enable the reader to interpret the circuits and to understand them at all.

For a preliminary understanding of the symbols and of switchboard principles, a short study of circuit diagrams representing the simplest types of switchboards will be made. An introduction to switchboards and apparatus parts by a study of a set of the simplest of the symbols used to represent the parts, followed by the exercise of reading a few simple circuits embodying the principles of switchboard operation, will prepare the student for a thorough understanding of the symbols and of the circuit methods of the more complete and more complex diagrams.

A telephone switchboard consists fundamentally of two parts, comprising respectively, two classes of apparatus. First, there are the line terminals. Second, there are the devices for connecting together the terminals of the lines. All other apparatus is auxiliary to these two fundamental divisions of the switchboard devices, and may be considered after these two classes of apparatus are understood.

In a small switchboard, each line has one terminal; in a large switchboard it may have many. Because of the multiplicity of terminals for each of the telephone lines, a large switchboard having such line equipment is called a multiple switchboard. Each line terminal is equipped with a device which presents the line's electrical conductors ready for the attachment of other conductors, whereby the line may be extended electrically by attaching removable conductors when the switchboard operator desires.

The connecting apparatus, or second division of the switchboard devices, consists fundamentally of flexible electrical conductors, each conductor having at each end a device for attaching it removably to any line terminal. It will be seen that one of these flexible conductors may be taken in the hands of the operator and its two ends fastened to the line terminals and therefore to the line conductors of any two lines in the switchboard. By such



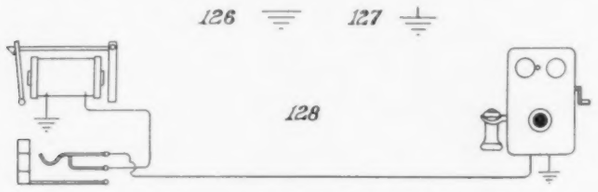
Figs. 121 to 125. Line Circuit and Its Symbols.

an act on the part of the operator, the two lines would be connected electrically, and patrons at telephones upon the two lines might talk with each other.

As a rule it may be stated that the simpler the line equipments for each line the more complex are the connecting devices for each connection, and vice versa. Also, the smaller the switchboard, the simpler are both the line and connecting devices, and the larger the switchboard, the more complex are both.

The "size" of a telephone switchboard is measured

and expressed usually not in terms of feet and inches, but in terms of the number of telephone lines for which terminals are provided upon the board. This method is modified sometimes to an expression of the number of telephone substations which the switchboard will serve. This distinction sometimes makes an important difference when party lines are considered. By putting more than one telephone upon a line, and by providing additional



Figs. 126 to 128. Grounded-Line Circuit and Earth Symbol.

connecting apparatus to handle the additional traffic, the number of telephone stations handled by a switchboard may be increased without increasing the number of lines terminating upon the board.

So far as talking is concerned, the above considerations cover a simple switchboard. In addition to talking facilities there must be signaling means, both to enable the subscribers of the exchange to signal the operator (to "call" the "central" office) and to enable the central office operator to signal the subscribers, that, is, to ring their bells.

Taking the line terminals first, the simplest switchboard provides each of the lines with a small device which has a shutter or target similar to the "annunciator drops" sometimes used in hotels to locate or identify the guest room in which a calling push button has been pushed.

In a small simple switchboard serving magneto lines, each line terminates in one of these "drops" and in a connecting device called a "jack." At the other end of the line is the subscriber's telephone set. This condition may be studied by means of a diagram.

Fig. 121 shows the annunciator drop. The magnet, easily recognized by its form of spool with protruding core ends, has at the right a comparatively heavy armature, pivoted at the top, from which a light finger, or "reed," extends above the top of the magnet toward the left and ends in a hook. Under the hook of the reed is positioned a light drop shutter, pivoted or hinged at the bottom, and inclined toward the left, so that it has at all times a tendency to fall. This shutter may be assumed to be non-magnetic, that the magnet core will have no effect in withholding it from falling. The operation of the device now is clear. When current flows through the wire winding of the magnet the core attracts the armature, the lower end of the armature swings to the left toward the core, and the hook end of the reed is lifted, releasing the shutter. The shutter falls by its own weight, and may be restored by the hand of the operator after the current through the magnet has ceased.

Fig. 122 shows a simple jack; not the simplest, but the kind which is used in such small magneto switchboards as are now under discussion. In mechanical construction it consists of a cast body indicated by the letter *a*, upon which casting are mounted the moving spring *b* and the fixed contact point *c*; insulation is provided at *d* and *e* to keep the three parts electrically separate. The jack body is drilled at *f* with a hole usually one-quarter of an inch in diameter, for a purpose which will be disclosed presently.

Conducting wires are represented by simple lines, as shown in Figs. 123 and 124. In Fig. 123 the lines are represented as crossing without touching, the vertical wire jumping over the horizontal wire, if one chooses to think of it in that way. In Fig. 124 the wires are definitely joined. The small circle may be taken to represent a soldered joint between the vertical wire and the branching horizontal wire.

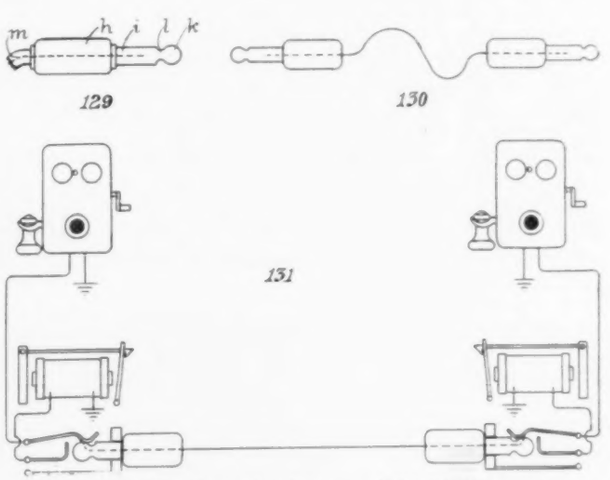
The assembled apparatus in Fig. 125 represents the complete switchboard equipment of a subscriber's line in a small magneto switchboard, together with the two wires of the line itself, and the substation telephone. The substation telephone here is symbolized, the case rather than the circuits thereof being presented. The circuits may be assumed to be those of one of the substations of Fig. 118.

By turning the crank, an alternating current is sent out over the line wires, sufficient in strength to cause the magnet of the drop to attract its armature, lifting the reed and releasing the shutter. This is called "tripping the drop" or "throwing the drop." It is seen that the drop magnet in Fig. 125 has the same relation to the substation at the right of the figure that the ringer of the left-hand substation of Fig. 118 has to the substation at the right of Fig. 118, and that any current sent out from the substation telephone at the right of Fig. 125 must pass through the magnet of that drop, and "ring the drop down" instead of ringing the bell of a distant station.

The telephone system of Fig. 125 may be simplified by changing the diagram to show a "grounded line."

A "grounded line" is a telephone line in which but one wire is strung on the poles, and the earth, which is a fairly good conductor under most circumstances, is used as a return path for the telephonic currents. Grounded lines are used for many farm lines, and were used exclusively for all telephone lines when the telephone was first used.

To convert the telephone line into a grounded line,



Figs. 129 to 131. Connecting Devices and Grounded Connection.

one wire from the central office is taken to a rod driven deep into the ground, or soldered to a water or gas pipe; at the substation, also, one wire from the telephone is similarly connected to ground; then the remaining wire from the central office and the remaining wire from the substation telephone are connected to the two ends

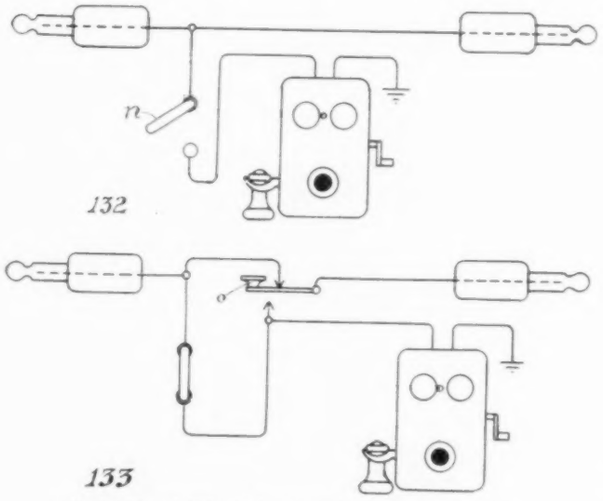
of one line wire. The circuit is now a "grounded" circuit.

To convert the diagram of Fig. 125 into a diagram representing a grounded line, first the symbol for a ground or earth connection must be found. This is shown in Fig. 126, and is shown with a connected wire in Fig. 127. Applying these to Fig. 125, in the manner described above, there is produced the diagram of Fig. 128.

In Fig. 128, when the crank is turned, current flows from the substation telephone set over the line wire to the moving spring of the jack, then to the fixed contact point of the jack, then to and through the drop magnet, then to ground or earth, thence by means of the conductivity of the mundane sphere to the ground connection of the substation, and up the ground wire to the telephone set, completing the circuit and energizing the central office drop.

In response to the falling of the subscriber's drop, the operator must connect with his line, and must connect his line with any line desired. This is the purpose of the central office, and the reason for its existence.

A connecting device as used by the operator consists, as has been stated, of a flexible electrical conductor having at each end a device for attaching it removably to any line terminal. The connecting device, called a "plug" or "switch plug," is shown in Fig. 129. For switching grounded lines, where but one conductor is required, the plug proper consists of a solid body of metal, usually with a shielded handle. The handle is indicated at *h*, the shaft or "body" of the plug at *i*, the tip of the plug at *k* and the reduced neck at *l*. A flexible conductor is shown at *m*, connecting through the dotted line to the metallic or conducting portion on the plug. A pair of plugs on a flexible conductor are shown in Fig. 130, and two subscriber's lines connected by a pair of plugs and a flexible cord are shown in Fig. 131. The operation of the plug of Fig. 129 when inserted in the jack of Fig. 122 is to engage and lift the moving spring



Figs. 132 and 133. Refinements in Connecting Devices.

away from the fixed contact point. This condition is shown in Fig. 131. The bent portion of the spring *b* of the jack of Fig. 122 tends to hold the plug in place by taking a seat in the neck *l* of the plug, until the plug is forcibly removed by the operator.

In Fig. 130 a switching device is shown in its simplest conception, and in Fig. 131 it is shown in use. A switchboard once was built using a connecting device of this simple character, and it was a remarkably efficient switchboard, giving a service which was both prompt and reliable. Modern switching methods, however, require elaborations and refinements of apparatus which are embodied in even the most simple boards.

The first requirement for the refinement of the

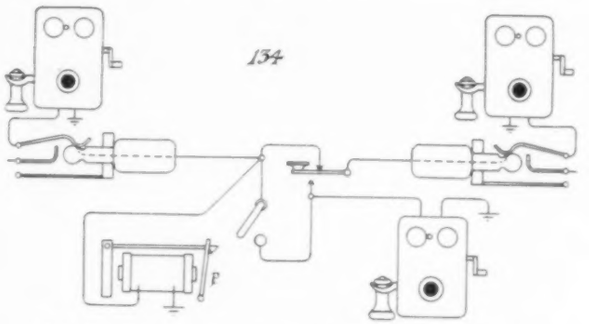


Fig. 134. Complete Connecting Device for Grounded Lines.

crudely simple device of Fig. 130 is that the operator at the central office be enabled to talk with the calling subscriber, to ask the number of the line with which he desires to be connected. This introduces the "listening key," a key or switch which permits the operator to connect her telephone with the calling line. This is accomplished by providing the little switch at *n*, shown in Fig. 132. The operator thus may talk with the calling subscriber, and may ring his bell by turning the crank of the central office telephone set. Incidentally, after both of the connecting plugs are connected with the two lines which are to engage in conversation, and in the natural order of events the bell of the telephone of the called station must be rung, the operator may ring that bell by turning the crank of the central office telephone set. With the diagram of Fig. 132 the current would divide upon the flexible conductor between the two plugs, some current flowing out to the bell of the station to be rung, and some current flowing out to the station upon the line which had called, thus "ringing in the ear" of the calling subscriber. Another refinement now is placed in the connecting device, this one being called a "ringing key." It is shown in Fig. 133. By depressing the knob *o* after opening the listening key, the central office telephone set is connected with the station to be called without being connected with the station calling, and therefore the bell to be rung may be operated without annoying the calling patron.

Still another refinement is required before the connecting device becomes in all fundamental requirements suitable for use in the switchboard of today. The subscribers must be able to signal the central office, to call the operator, even when they are connected. For this purpose a drop is added to the connecting device, or cord-pair, as shown at *p* in Fig. 134. In case either of the subscribers connected as shown in Fig. 134 should turn the crank of his telephone set, current would flow from his generator, over the line wire to the central office, where it would divide, some going to earth through the clearing drop and some continuing to the remaining plug and over the connected line to the other substation of the connection, actuating the ringer of that telephone set. Thus he would ring both the central office drop and the distant connected substation bell. Fig. 134 shows a

complete connecting device symbolized to its greatest simplicity.

A metallic circuit connecting device, or so-called cord-pair, is shown in diagram in Fig. 135. As compared with the "grounded circuit" line, the "metallic circuit" line has two conductors instead of one. It is the same with the cords and connecting devices and keys of the central office. The plugs must carry two conductors instead of one, an insulation separation being made between the tip and the body of the plug. The cords must carry two conductors instead of one, one of those conductors connecting to the tips of the plugs and the other connecting to the bodies or shafts of the plugs, as shown by the dotted lines in the plugs of the figure. In the

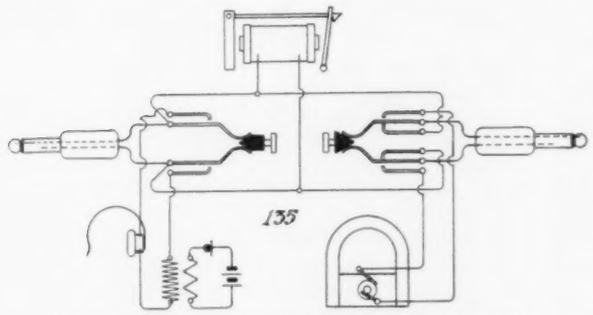


Fig. 135. Complete Connecting Device for Metallic Lines.

listening key there are two long springs, and two short springs or contact points with which the long springs make electrical engagement when they are bent by the black wedge of insulation, which is so arranged as to bend both of the long springs at once. In the ringing key, also, the springs are duplicated, breaking both sides of the metallic line and connecting both sides of the right-hand plug to the central office generators. The talking equipment of the central office telephone set is shown separated from the generator in this instance, which is the custom in switchboards. The clearing drop is connected from one side of the line to the other at such a point that it does not get current from the central office generator.

Fig. 125 has shown a metallic circuit equipment for a subscriber's line. Fig. 135 shows a cord pair or connecting device suitable for connecting together two lines such as shown in Fig. 125. As an exercise in reading circuit diagrams, the student may draw two lines as shown in Fig. 125 and connect them by the device of Fig. 135. Skill in reading will be promoted by the act of drawing the suggested diagram, as well as by reading it afterward. The movable spring of the jacks must connect with the tips of the plugs, but not with the bodies of the plugs, and the movable springs are lifted from the contact points or short springs when the plugs are inserted, as shown in Fig. 134.

(To be continued.)

The Michigan Convention

The Michigan Independent Telephone Association held its twelfth annual convention at Saginaw, March 24 and 25. The meeting was called to order by its president, E. B. Fisher, who discussed the doings of the state legislature. He urged the providing of reliable statistics for census purposes, and claimed that had the true record of independent growth been available, long distance connection with Chicago would now be accomplished by independent companies. Reports from the association members were universally good.

The evening of the first day was given over to sociability and entertainment, winding up with a most enjoyable Dutch lunch.

The session of the second day was opened by S. E. Fisher with a paper on "The Relation of the Small Telephone Company to the Large," urging that large and small must work together.

A. H. McMillan read a paper on "Telephone Legislation," which was particularly interesting at this time.

J. J. Speed's paper on "Telephone Accounting" followed, with a description of various valuable forms.

L. L. Conn treated on "Advertising Long Distance Business," saying that if independent operators advertised the independent system as a whole instead of as separate organizations, the public would be brought to realize the extent of independent long distance lines. He also stated his belief that before long a general publicity campaign would have to be undertaken by the independent forces.

C. E. Smith gave "A Study in Long Distance Traffic," urging the development of long distance business.

F. M. Howard discussed "Coupons—Their Necessity and How They Can Be Handled Equitably," declaring in favor of a universal coupon book, to be cleared through a national association.

The officers of the association were re-elected as follows: E. B. Fisher, Grand Rapids, president; W. S. Vivian, Grand Rapids, secretary, and A. C. Himebaugh, Burr Oak, treasurer.

The traffic committee consists of S. E. Fisher, Detroit; C. E. Tarte, Grand Rapids; W. J. Melchers, Alma; A. C. Himebaugh, Burr Oak; H. P. Gibbs, Saginaw; W. S. Robinson, Muskegon, and I. C. Bausch, Cleveland.

The officers of the traffic association are C. E. Tarte, president; W. S. Vivian, secretary, and A. C. Himebaugh, treasurer.

A Novel Telephone Receiver

A telephone receiver without a diaphragm has recently been devised, for which many advantages are claimed. It consists of a permanent magnet, the poles of which are connected by a soft core, making a continuous magnetic circuit. A coil wound around this core is connected to the transmitter and battery. When the transmitter is spoken into, the current affects the entire magnetic circuit of the receiver, reproducing the voice very distinctly. It is said that with this receiver there are no overtones or disturbing sounds due to the vibration of a diaphragm. In one modification of this telephone the sounds were produced with such clearness as to fill a large hall.

Keystone Company's Report

The Keystone Telephone Company of Philadelphia reports gross earnings for eight months ended February 28 of $707,141, against $698,823; net earnings of $357,168, against $329,180, and surplus after bond interest and renewal reserves of $81,568, against $55,607 in 1908. For February the company earned gross $89,409, against $41,199. The surplus was $11,194, against $6,639.

The Telephone for Train Dispatching

By W. E. Harkness

Paper Read Before the St. Louis Railway Club, February 12, 1909. Concluded from the April Number.

THE telephone apparatus used for train dispatching service should be such as to render the voices of both the dispatcher and operators distinct and of sufficient volume to prevent mistakes.

To accomplish this in a satisfactory manner due consideration must be given to the conditions which must be met, and in this connection it should be remembered that the conditions on a dispatching circuit differ in many ways from those prevalent in either local or long distance service.

Special Way Station Transmitter Arm with Fixed Transmitter and Receiver, Allowing the Operator the Use of Both Hands.

The length of the line, the kind and size of wire, the number of stations connected to the line, the kind of telephone, transmitter, receiver, induction coil and circuit, together with the kind and amount of current supplied, all have a bearing on the service and changes in any one of these factors will affect the service.

With but few exceptions, the lines constructed for telephone dispatching have been of such character that there should be no difficulty experienced due to the length of the line or the kind and size of the wire.

The number of stations connected to the line vary from ten to forty-four, and this, with the various methods of operation, has necessitated special attention being given to the point.

In regular commercial telephone service there are usually but two people talking or listening on the line at a time, while in dispatching service it is customary to have from three to five operators in addition to the dispatcher all connected to the line at the same time, and, in addition, an unknown number of other stations listening to their conversation. The limit in numbers being fixed by the total stations having access to the line. These two conditions demand entirely different telephone apparatus and circuits, as in the first case the telephonic currents are divided between the receivers at the two stations, while in the second case the telephonic currents must be divided among the receivers of three, five or even twenty or more stations, depending upon the number of operators listening in on the circuit.

Loud-Speaking Receiver.

Various methods of rendering efficient service under these severe conditions have been proposed and tried. Some have attempted to equalize the telephonic current passing through the receivers at the various stations, others have increased the volume of transmission, and still others by a combination of the two have attempted to secure more satisfactory results. In some cases increased volume of transmission has been accomplished at an increase in battery consumption and a decrease in the clearness of articulation.

In others the volume of transmission has been decreased to obtain clearer articulation.

The great difficulty in settling a matter of this kind is the fact that there is no standard which can be readily used and with which the actual service rendered on a line can be compared. No two users of a telephone will agree as to the relative volume of articulation obtained on two different circuits, as it is largely a matter of opinion. Even with skilled observers differences in volume of transmission are often taken for differences in quality or articulation and vice versa, or the amount of difference will vary within a wide range. With the ordinary user of the telephone these errors are greatly magnified and therefore anything but correct. A comparison of a laboratory standard and a working line is a physical impossibility if the tests are to be made by the same parties and under the same conditions.

Foot-Switch.

In comparing the relative merits of telephonic apparatus, it should be remembered that the conditions should be the same throughout, and that comparisons made by observing the service on one line and then several days later observing the service on the same or a different line can not be considered as fair, as it is impossible for the mind to accu-

rately retain the impressions imparted by the ear for any length of time. Further, in making tests on actual lines it is impossible to control changes in atmospheric or physical conditions and changes may occur in an instant which will seriously affect the results of a comparison.

It may be of interest for you to hear how accurate comparisons in transmission are made, and the standards which are used.

The limit of commercial transmission is taken as that obtained over a 1,000-mile circuit of No. 8 B. W. G. copper, using standard telephone sets and circuits. It is, of course, impossible to make tests over an actual line of this kind, so the characteristics of such a line, such as resistances, capacity and impedance, all of which have an effect on telephone transmission, being known; artificial lines have been constructed which possess all of the electrical properties of the actual line, and comparisons are made with these as a basis. To reduce the chances of error still further these artificial lines have been compared with standard No. 19 gauge paper insulated telephone cable and reduced to terms of miles of No. 19 gauge cable. This establishes a unit of comparison, and all comparisons are expressed in these units. In this way it has been determined that transmission over 1,000 miles of No. 8 B. W. G. copper circuit is equivalent to that obtained through 30 miles of standard No. 19 gauge paper insulated cable.

In the same way comparisons have been made with circuits of various gauge wires, both of copper and iron, and the results of tests can thus be expressed in terms of any character of line or cable if so desired or conditions set up equivalent to any length or kind of circuit. The development and construction of such standards require a large amount of time and money, which prohibits their general use.

With a standard artificial line such as has been described, a comparison of different telephonic apparatus can be made, and the differences in the service rendered determined without danger of the results being affected by unknown troubles on the line and, further, the differences can be expressed in definite terms.

With this arrangement differences in transmission can be determined which to the ordinary user could not be distinguished.

By an arrangement of switches, transmitters or receivers of various types can be compared or connected in circuit with various induction coils, thus determining the relative merits of various parts of the equipment. By another switch the battery supply may be varied and the effect of different amounts of current through the transmitter determined.

Numerous attempts have been made to measure the relative transmission obtained from telephone instruments of various types or to apply well-known mathematical formula to determine their relative merits, but up to the present nothing has been found to be as accurate as the method previously mentioned, owing to the fact that no instrument has yet been devised which will distinguish between good and bad articulation as accurately as the human ear.

For a number of months work has been carried on with the idea of developing apparatus which will enable transmission to be rendered having sufficient volume and clear articulation and at a minimum consumption of battery as to satisfy the most critical. It is expected that this work will be completed and the apparatus be available for use within a short time.

Various types of telephone sets are being used at the stations, each of which has certain advantages and disadvantages, and the selection is largely a matter of opinion based on operating merits or cost.

A number of the eastern railroads are using a special transmitter arm so arranged that the transmitter and receiver are fixed on the arm, and the operator upon placing his ear to the receiver has his mouth in line with the transmitter. This arrangement permits the operator to have the use of both hands and the operator is required to assume a proper position as regards the transmitter.

The arm is arranged with an adjustable mouthpiece on the transmitter, and an adjustable earpiece on the receiver to allow for different sizes and shapes of faces. A switch connecting the set to the line is operated when the arm is moved to the position in which it is used by the operator. A foot switch is used to close the transmitter battery in place of a key operated by hand. This is used to prevent a waste of battery and the introduction of noise on the line when an operator is listening in on the circuit.

The operators using these sets also operate the interlocking switches, and for this reason it was not thought advisable to use a set which would necessitate their wearing a head telephone which might interfere at times with their rapid movement.

A number of western railroads have been using a simple form of transmitter arm with which a head telephone is used, thus giving the operator considerable freedom of movement.

The telephone equipment is connected to the circuit by removing the head telephone from a switch hook upon which it is hung when not in use.

A key operated by hand is provided to close the transmitter battery during conversation. This key is arranged to open the transmitter circuit when released by the operator, thus permitting him to listen on the circuit without a waste of battery or causing a noise on the circuit. A foot switch could be used with this equipment if desired. The use of the transmitter key has not been found objectionable, as it is not necessary to hold the key when receiving, thus having both hands free for writing, and when talking the operator is not required to write, so that there is no necessity for him to have both hands free.

The only objection that can be raised to this arm is that the operator is not compelled to speak directly into the transmitter by the association of the transmitter and receiver. This apparently has not caused any serious trouble. In fact, the dispatcher can readily determine if the operator fails to use the apparatus correctly, as the difference between speaking directly into the transmitter or at some distance away from it is very apparent.

The desk stand arranged for a head telephone has also been used, principally on account of its low price. It is open to the same objections as the arm previously described and, in addition to this, is liable to injury by being knocked off the desk. It has the advantage, however, of being located so as to be convenient to several people.

Some roads have used a set between the transmitter arm and the desk stand, or what is commonly called a "flexiphone." This consists of a desk stand stem attached to an arm which can be raised or lowered so that it can be used while seated or standing and, in addition, can be rotated in a horizontal plane.

The dispatcher's equipment is practically the same on all of the railroads and consists of a chest transmitter,

supported by a band passing around the dispatcher's neck, and a head telephone.

This apparatus is connected to the circuit by means of a flexible cord terminating in a plug which, when inserted in a jack attached to the desk, completes the line connection as well as the transmitter circuit. This arrangement permits the dispatcher to move about and to have the use of both hands.

A transmitter key is provided, so that the dispatcher may listen in on the line without wasting the transmitter battery or bringing noise from the room on the line.

This key differs from those used at the way stations in that it is not necessary for him to hold it down when talking, it being arranged to lock when operated and remain so until released.

On account of this equipment being different from that with which they are familiar, the dispatchers in some cases have said that they did not like it. This feeling, however, is not lasting and after a short time disappears. The same feeling existed among the telephone operators in exchanges when similar apparatus was first introduced, but after using it for a short time they preferred it to that which they had been using.

It has been suggested that a loud speaking receiver be used by the dispatcher. This arrangement, while available and capable of giving a large volume of sound, is not satisfactory on account of the quality of the sound rendered being less distinct than that obtained from a regular receiver held close to the ear. This is largely due to the reflection of the sound waves in the horn which must be used to amplify the sound. Another objection to this device is that noise in the room or from outside will prevent the dispatcher hearing distinctly.

A device of this kind is to be tried on one of the eastern roads for use in block towers in connection with the reporting of trains from tower to tower. Another design is being prepared for one of the western roads for trial on a dispatching circuit.

The use of a double head telephone has been considered and should be of benefit where the dispatchers or oprators are located in noisy locations.

The use of a transmitter which could be mounted on the dispatcher's desk and which could be spoken to in place of having to speak directly into the mouthpiece as at present has also been suggested. This arrangement, while possible, would be found unsatisfactory for two reasons: First, it would render a poor quality of transmission, and second, it would necessarily have to be very sensitive to transmit the voice from a distance, and it would therefore pick up other sounds in the room which, when transmitted on the circuit, would affect the service.

It is possible that under some conditions such devices may render satisfactory service, but it is believed that much better service can be obtained by following standard practices which have proven satisfactory.

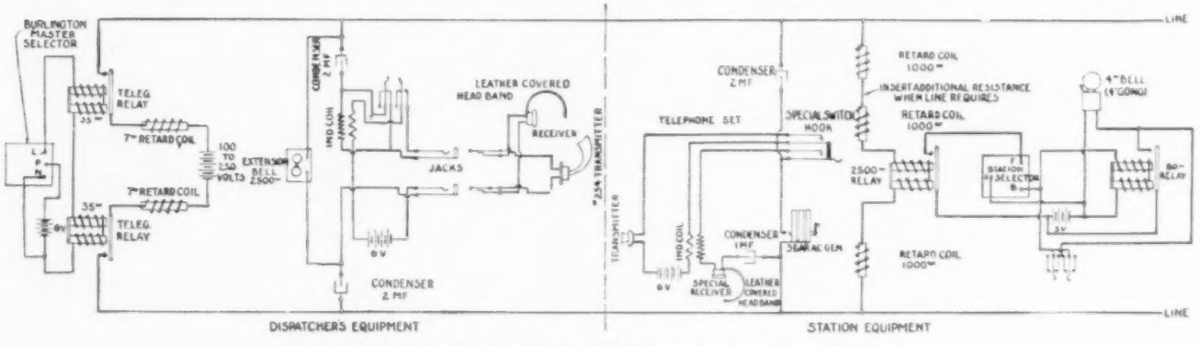
The cost of the telephone apparatus depends largely upon the type used and will vary from $17 to $36 per station. An average of $25 per station may be used for rough estimates.

The selective apparatus in general use may be divided into two general classes, based upon the method of operation:

1. Electromechanical.
2. Mechanical.

In general the apparatus consists of a selector located at the station, the operation of which is controlled by the dispatcher. The selector when operated closes a bell circuit and causes the bell at the station to ring until stopped by the operator answering the call. The operation of the selector is affected by the dispatcher sending a combination of impulses of current out over the line; the time between the impulses or the combination of the impulses operating the selector at the particular station desired.

The sending of these impulses at the proper intervals or in the proper combinations is done automatically by the dispatcher operating the station and starting keys on his calling mechanism.



Dispatcher's Telephone Circuit, as Used on the Burlington System.

Various methods of operation have been suggested and tried. The first method, and one which is still used, is to call each station consecutively. This arrangement required eight seconds to call any one station, or in case a number of stations were called it would require eight seconds, times the number of stations, to call all stations desired. For example, three stations would require a total of 24 seconds or five stations a total of 40 seconds.

While the above time was much less than the time taken to call by telegraph, higher speed of calling was demanded and arrangements were made to enable individual stations to be called in from two to thirty seconds or all stations up to 28 could be called in 30 seconds. A still further improvement enables all of 50 stations to be called in a total of 50 seconds or individual stations of the fifty in from 2 to 20 seconds.

Some objection has been raised to the bell at the station ringing continuously until the call is answered by the operator, for in some cases a station might be called by mistake and the call not answered for hours owing to the absence of the operator. This would cause a waste of battery and increase the maintenance expense.

Several schemes have been proposed to accomplish the desired results and apparatus is now available for this

purpose. One arrangement permits the dispatcher to stop the ringing of the bell at any time after it has started. Another arrangement permits the bell to ring for a certain length of time and then automatically causes it to cease.

It is believed that the continuous ringing bell will insure quicker answering of the calls than where the bell rings for a short interval and then ceases. This is based on the experience with the present continuous ringing systems and also upon a similar arrangement in telephone exchange practice in connection with the ringing of subscriber bells by machine until the call is answered.

One of the selective systems has one feature which is not supplied by any of the others and that is what is known as an "answer-back" signal. This consists of an audible signal received by the dispatcher when he has called a station and the bell has started to ring. This has several advantages.

First: The dispatcher is assured that he has called the station and the bell is actually ringing.

Second: The fact that the dispatcher is aware of this causes the operators to answer the call more promptly.

Third: It acts as a check on the operation of the station apparatus as the "answer-back" will always be received if the bell is operated.

The selective apparatus at the station consists of the selector, two relays, resistances and a few dry cells for the operation of the selector and bell.

A recent design of selector dispenses with the two relays, as the selector itself may be connected directly in the line in place of being operated by one of the relays. This reduces the amount of apparatus at the station, which is desirable from a maintenance standpoint.

The selective apparatus is operated by relays connected to the telephone circuit.

Two methods of connecting these relays in circuit are employed:

1. By bridging them across the telephone line.
2. By connecting them in series with the telephone line.

There are advantages and disadvantages with both arrangements.

With bridged relays the impedance must be high enough to prevent excessive losses in transmission due to the large number of relays bridged across the line.

The resistance in the relay bridge must vary at each station to furnish each relay with the proper amount of current to insure its satisfactory operation.

When the relays are connected in series with the line they must be of low impedance to prevent excessive losses in telephonic transmission. This is usually accomplished by shunting the relays with a non-inductive resistance. It is customary to connect one-half of the relays in series with one line wire and the other half in series with the other line wire, thus balancing the circuit. It has been found, however, that an exact balance in the number of relays is not necessary.

The disadvantage experienced with the bridged circuit is that in case one side of the circuit opens it is impossible to call a station beyond the break. With the series circuit it is possible to call every other station beyond the break. It may be well to state that with one wire open conversation can be carried on by telephone beyond the break. The transmission losses are less with the bridged circuit, but the losses due to the use of series relays are comparatively slight and in no case have they affected the service to a noticeable extent.

Several schemes have been used to facilitate the patching of the dispatcher's circuits. On account of their cheapness small knife switches have been used in many cases, and special telephone test panels, which are more expensive, have also been designed. With either of these arrangements patches can be affected very quickly, even by inexperienced people. The test panels offer more facilities for testing than the combination of switches and are less liable to trouble than the exposed switches.

The cost of the total station equipment, including telephones, selectors, test panels and installation, will vary according to the apparatus used from $60 to $96 per station. An average installation would approximate $80 per station.

Combining these figures with those covering the cost of the dispatcher's equipment and the line construction a dispatching circuit of 150 miles, to which is connected 30 stations, will cost approximately $15,000, or at the rate of $100 per mile.

This figure is not excessive when the advantages which may be derived from such an equipment are considered, and it will be found that the expense of construction and maintenance will be insignificant as compared with the amount saved by the prompt reporting of delays, the relieving of congestion of traffic and the reduction in the loss of time.

Austrain Army Adopts Field Telephones

Field telephones, which have for some time been used by the artillery, are now to be attached to every infantry corps in the Austrian army. Their employment has become a necessity under the conditions of modern warfare, where orderlies would almost certainly be shot down and signaling is slow and sometimes impossible. The telephone offers great advantages, it can be used over long distances and the operators require no technical training. It is proposed to take the signaling corps for telephone work, four men being attached to every sub-division. They will carry a very light equipment of microphones in cases and specially light wire. Telephones will keep each division in constant communication with the others and also with headquarters during fighting as well as through the night. The authorities believe that the handling of troops will thereby be greatly facilitated. Telephones have proved far superior to the field telegraph which requires skilled operators as well for the writing as the deciphering of messages.—*The Engineer.*

Legislating Telephonic Secrecy

Two bills have been introduced in the Ohio Legislature making it unlawful for anyone to eavesdrop during a conversation over a telephone, tap telephone wires, repeat a conversation heard over a telephone wire of interfere in any other way with the service. Some crudities have been found in the bills as presented, and it is possible that a new bill will be drafted and the main features of both included in it. As they now stand no one would be able to use another's telephone without committing a crime. The principles of the bills are favored by most of the members of the Legislature, it is said, on account of the complaints that have been made from time to time regarding the interference with telephone lines.

Factory Cost Accounting by Telephone

By Edgar M. Snell

THE specialized use of the telephone is becoming daily of greater importance in the arts. Army and navy departments, police and fire systems, public service and manufacturing concerns, all find need for special methods of communication under special conditions; and to these peculiar requirements the telephone has been successfully adapted.

The factory intercommunicating telephone is in itself a specialized instrument. But where the conditions of work give rise to certain problems of system which demand the centralizing of reports from a considerable area with a minimum loss of time, the usual form of the shop telephone system has met the condition admirably, and with very little change.

Timekeepers Wearing Head Receivers and Breast Transmitters.

An interesting example of special application of the intercommunicating telephone is the system followed by the De Laval Separator company, at Poughkeepsie, N. Y. This concern manufactures about twelve types of high speed machines of a somewhat complicated nature and many parts, the shop operations averaging in the neighborhood of ten to each part.

This factory plant embraces a floor space of something like 180,000 square feet, and the workmen are well scattered over it. This condition makes it difficult to secure accurate records of the time each man spends on each operation, without necessitating a trip to the time clock every time an operation is completed in order to have his card stamped. The installation of a large number of time clocks, so situated that no workman would be more than a few feet away from one of them, seemed to be the only solution of the difficulty. But the cost of such an installation would be large; and while it might prove a desirable investment, the prospect of such expenditure naturally suggested inquiry as to possible substitutes for the system.

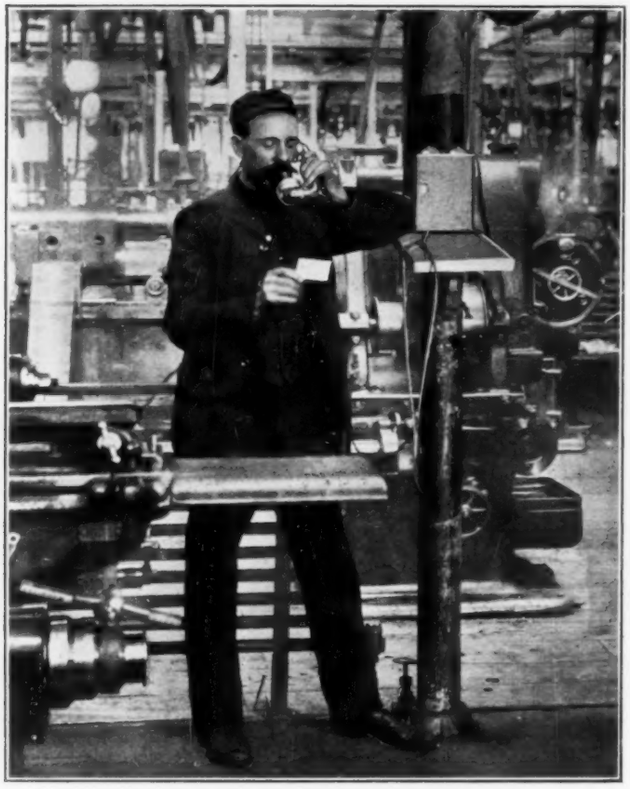
It is to the superintendent of the factory that credit is due for the final solution of the problem. An intercommunicating telephone system was already in use throughout the different departments, and observing that the branch exchange operator had plenty of spare time, he conceived the idea of telephoning to a central timekeeping department when a workman started and ended his job. This was tried at first in one department, and worked so well that it was extended through the whole factory, and now the entire force of six hundred and fifty men is timed in this manner. A card is issued for each job, and from fifteen to eighteen thousand cards are handled weekly. A large percentage of the operations are piece work, and by means of the accurate data obtained for each

operation, the superintendent decided to operate the plant on a premium basis.

At first thought it would seem that there might be considerable congestion of messages on the wires if a large number of men finished their jobs at the same time, but this has not been the case, and there are seldom any delays. When a job is reported as finished the new job is also reported, and the actual time in making this report is never more than fifteen seconds. As a matter of fact, there will be far more congestion of men if they are required to go to a time clock to have their cards stamped, and they will occupy a certain amount of floor space which could be used for other purposes.

The telephoning is done entirely by sub-foremen or by clerks in departments where they are otherwise needed, but in no case have extra clerks been engaged for this purpose.

The duties of the sub-foremen or gang bosses are



Gang Boss Telephoning Job Record to Timekeeper.

to inspect and supervise only, and being constantly in touch with each man's work, they always have jobs ahead for them. This method alone will effect a large reduction in labor costs, for if workmen waste even a small fraction of time between jobs the total waste where hundreds of men are employed will be a large loss in production.

The timekeeping department is located at one end of the factory, in a separate room, and the cards are stamped by the calculagraph. This is done by operating the right-hand lever of the machine when the job is started, and the left-hand lever when the job is finished, the timecard having been inserted in the machine prior to each operation; the record thus made shows the time of starting the job and the elapsed time or actual working time in hours and tenth of an hour.

This mechanical computation of the actual working time saves an immense amount of time and labor on the part of the clerks. Three clerks, who wear head telephone receivers, operate the calculagraphs and make all the extensions on the day-work cards.

When the sub-foreman starts a workman on a job he telephones to the timekeeper the class of work, man number, operation number and the number of pieces for the job just finished. Cards for production, re-work, construction, repair or expense (a distinctive color for each classification) are stacked up in front of the timekeeper, who, when he receives the message, takes the proper card, writes on it the information telephoned and opens the record with the calculagraph. The record is closed for the previous job by the calculagraph and the card filed in the rack under the man's number.

About thirty minutes before closing time new cards are made out for the jobs that are carried over to the next day, and the following morning one clerk stamps and sorts these cards in the rack, while the other two receive the telephone messages for the new jobs. This method prevents any congestion which might possibly occur if it were necessary to write cards for the entire force at 7 o'clock every morning. At the end of the day the cards are sent to the payroll clerk and the calculagraph records of elapsed time are entered on a payroll sheet; they are then sent to the piecework clerk, who fills in and extends the prices and reassorts and files the cards by operation numbers.

To facilitate this filing, all expense orders are numbered from 1 to 125; production orders, from 20,000 to 50,000; construction orders, from 50,000 to 60,000; shop repairs, from 60,000 to 70,000. Tab holders, with white paper for units and tens, red paper for hundreds and blue paper for thousands, make this filing very simple. The material, transfer, defective and re-work tickets are placed in a separate file under the different job numbers. When the job is completed the cards are listed on an adding machine for totals of hours, money and pieces for each operation. These totals are then entered on a comparative cost sheet, on which is kept a record of the last six similar jobs. A comparative cost sheet of parts and machines, showing the increase or decrease cost per hundred, is sent to the superintendent, who, in case of an excessive increase or decrease, sends it to the foreman for an explanation.

The timekeepers are required to call back over the telephone the figures received in each message before writing them down. So proficient have they become in regording the messages that, although fifteen to eighteen thousand cards are handled in a week the average number of mistakes of all kinds has been only five. The elapsed time records are in hours and tenths, and as the cards are listed directly on an adding machine, and the totals only entered on the comparative cost sheet, there is no copying of figures. This method of reporting the time can be employed to great advantage in any factory where the floor space covers a large area. There is no question but that the intercommunicating telephone system would save its cost many times in the course of a year. If a man works on ten jobs during a day he will consume at least two minutes in going to and from a time clock, picking up his tools and starting his machine before he begins his next job. Two minutes on each job, or twenty minutes a day at thirty cents an hour, means a loss in labor cost for one year, in a plant where there are

five hundred men employed, of over $15,000. As a matter of fact, the cost accountant of the factory where this telephone system is used has estimated that there has been an increase in production of over five per cent, due entirely to the fact that the workmen never have occasion to leave their work, and immediately take up a new job when the old one is completed.

The separate card for each job with the elapsed time record is in itself a great improvement over the old form of card on which was kept the time record of all jobs a man worked on during the day, and made it necessary to compute the working time, pick out each job number and enter the items on a sheet or in a book. By using a separate card for each job the total time and value for each classification, such as man number, job number, operation number, department, etc., are obtained by simply assorting the cards under the classification desired and adding the records directly from the faces of the cards.

In the case described the telephone system used was a private branch exchange switchboard. It is obvious, however, that a true intercommunicating system would answer as well, and perhaps show some advantage in the elimination of interference from outside calls. The system is adaptable to either type of telephone installation; and it answers the requirement for a centralized scheme of time recording. As a time saver, it is efficient enough to deserve a telephone installation of its own.

Some Questions Answered

By J. C. Kelsey

[This department is at the command of our readers. Questions relating to all branches of telephony—technical, financial, ethical, or otherwise—are invited, and will be answered in the order received. Names of inquirers will not be used unless desired.—*Editors.*]

TROUBLE is one of our early words. Trouble began officially when Eve listened to the smooth words of the serpent. Since that time, the lawyer takes care of our legal trouble, the doctor looks after our bodily trouble, and the minister comforts us in our spiritual trouble. We all know exactly where to go when beset by these matters.

Frenzied finance troubles are strictly new. Ordinary financial troubles are not. Did not the parties engaged in the talent deal get off differently? When the eleventh hour man received him his penny, did not the growls of discontent issue from the throat of the man who went to work at the first hour?

When in financial trouble, to whom do we go? When our friend sells us all of his mining stock, to whom can we go? The lawyer has bought some, too, and, of course, the doctor has also. Even the minister has some secret financial sorrow.

The poor man can go to the pawnbroker! the rich man can go to the banker and can compel assistance, because the bank cannot afford to have it known that it has been stung. Others go to the lawyer anyway, and together they go through the primrose path of the bankruptcy court. The buyers of minority stock can go either to the minister for comfort, or the newly created financial editor. Here he gets his money's worth.

* * *

This reminds me of something good in *Telephone Securities Weekly* of April 10. In this number there were wholesale trouble discussions. The editor has his theory of the Bell troubles, and a member of the Central Union Telephone Company is given credit for an opinion. First of all, I want to express my faith in the general value of this financial paper, and if anyone can find anything wrong with it, let them go further back to the hired organs that threw mud and general filth upon independent telephone industries. They started the row, and they will be sorry, for the editor is a man of wit and resource. His handling of the New Orleans telephone wizard was a masterpiece. The editor speaks as follows:

> The trouble is, the Bell management perpetually surveys the telephone field through the large end of the telescope. Owing to its close relation with important banking groups in Boston and New York the parent company is in a position to command a fairly ready sale for its securities. But so far from strengthening its position, this really weakens the entire structure. It is the old story of the rich man's son, who, in constant command of plenty of ready money, has no appreciation of the value of the money, nor of the need of applying it to practical, economic uses. The prodigality and looseness of the entire Bell administration is due undoubtedly to the very fact which is so generally given as a source of its strength—that is, its ability to command ready money in large quantities. It is this that makes for gross extravagance all along the line. It is this that permits the operating costs to mount so enormously high.

The Central Union man gives his version as follows:

> The trouble with us is we have always had too much money and it has been too easily available. If we had been compelled to stand on our own bottom, we would today be in a much stronger condition. The fact that we have been able constantly to borrow, and now owe the A. T. & T. over $18,000,000, is directly responsible for our present weakness. It explains why the Independents in our territory outnumber us four to one, and why they are, on the whole, prosperous and we bankrupt. The best thing that could happen to the Central Union tomorrow would be a foreclosure. The appointment of a receiver and all the drastic reformation that comes of such a condition would harden our organization and put us on a real working basis.

The illustration of the rich man's son is a good one, and comes close to the mark. It applies to the Bell company. It applies to churches, and it applies to colleges. It even applies to our humble early life. When the chickens had old tumble-down places to lay in, they did it daily. When the new sanitary improved coop was built, they quit. When colleges are poor, they do better work than when their income in unlimited. When they get rich they get lazy. The poor church saves souls. The rich church loses them.

Comparative poverty is a blessing. Independent companies, reared on low rates, have actually extended out of earnings, and have learned to thrive upon little. They are good fighters and you and I will not live to see them surrender.

Had the Bell company been suffering from poverty, they would not have tried to buy out hundreds of plants and entirely rebuild them when they knew it would not pay. Had they been raised in poverty, do you suppose they would have resorted to a free service campaign

anywhere? There is nothing the American citizen despises as much as getting something for nothing.

There is a system in a little town in western Iowa controlled and owned by two bright and clever young men, who are making some money on their $1.50 and $1 rates. They are satisfied with the returns, and the people are contented with the service. The Iowa Telephone Company is actually building a new plant in the town, in the hope of getting some local toll business, and some of the $1.50 and $1 business. But the rich man's son idea can express the folly of this. If the Bell company would gild every pole, they could not get a paying business there. As money saved is twice earned, here would have been a chance to make something.

But it seems to me that there is a great deal of barking up the wrong tree. I do not believe for a single instant that the parent company is in any trouble whatever. This company deserves the thanks of the entire independent industry for showing to the world that it could not only have a great increase in gross earnings, but a net as well, in the most desperate time of financial distress. During which time not a single manufacturing company has made a dollar, nor most other trades—except, of course, the automobile and diamond industries.

The telephone business is so fundamentally sound that the making of money cannot be helped.

* * *

About barking up the wrong tree, it reminds me of a story once told around Duluth. It seems the Merritt Brothers had gotten hold of practically all of the known iron ore in Minnesota. They needed a railroad to bring the ore to the boats. They went to the oil magnate, known as Mr. Rockefeller, and tried to interest him. This astute gentleman sent his staff of experts into the heart of St. Louis county, and they found that even the Merritts did not realize the extent of their wealth. So, the philanthropic man gave these northern men carte blanche, which means to "dig in but look out." They dug in, and built one of the best railroads in America. It cost lots of money, but they did not care, because they had money to burn, and more to dig out of Minnesota. One day, banks failed, and men's financial hearts were troubled. John D. Rockefeller was in danger of starvation, and had to have the money that the Merritt boys used to build their road. Would not the boys pay the distressed gentleman back? Certainly, thought the Merritt boys, we will get it from the Duluth banks. But, to the actual shame of the "City of Repudiation," they would not even give the Merritt boys a pleasant smile. So, the poor distressed man of Cleveland then owned all of the iron ore, and the Merritt boys got on intimate terms with a pick once more, and went to work again; sadder, but, of course, much wiser men.

* * *

The parent company is the Rockefeller of my story and the minor stockholder takes the place of the Merritt brothers. A few years ago, the company opposing the Kansas City Home Telephone Company was a real telephone company, and the stockholders waxed proud, thinking that his descendants would approve of his sagacity. Today, the minor stockholder of the distressed company gets nothing but bear reports, even when $60,000 would pay the dividend. Any telephone company with gross earnings over $2,000,000 has no right to pass dividends so small.

Years ago, the minor stockholder was not a minor stockholder, and the demands of competitive conditions made him a borrower. Naturally, he went to the rich parent, and he has lost control, and has nothing save little honor, for he never had the consideration for the public that the parent now has. But some day she will want the money, and then the Central Union man will have his wish, for foreclosure will result.

The editor is right about the prodigality; but the rich man's son did not do the spending altogether. Everybody spent it. Even the poor man. Millions went into all kinds of plants, good and bad. It seemed that all men were crazy with the heat. They built lines, made foolish contracts, and were far from earth generally.

But still the parent company has enough to show for her prodigality. No man would refuse to give the amount of the floating debt for the property involved, if he had money to invest. The mother company gets 4½ per cent of the gross earnings, and interest on the debt. It has command of the books, and it seems to me that the old elastic conscience of the puritan, which allowed him to burn his business rival as a witch, is still working overtime, and what is due to the parent can be eked out. I heartily disagree with anyone who says the parent company is in trouble.

* * *

Talking about elastic conscience, and the puritan method of doing business, did you ever realize that every man connected with the purchase of the Kellogg company has been removed from his position? A strange coincidence, since the president of the parent company and the president of its manufacturing company have been relieved. The puritan father of 1620 to 1720 whipped his son unmercifully when he was caught stealing watermelons, if that poor country could raise them, and he kicked his erring daughters clear into the bay. He was a proud being. He hated being caught. And when he or his were caught, he made some ostentatious movements to show his displeasure.

But the courts have not come to the promised relief of the minor stockholder. Like Lazarus, he is still pleased with crumbs from the rich man's table. Being legal still, the pillage of the minor stockholder goes on, and no conscience is disturbed.

Overdoing the maintenance act is pillaging the minor stockholder. Life is too short to wait for the consummation of wonderful construction plans. The man with one hundred dollars hopelessly tied up in the property ought to get five or six dollars once a year anyway. But he does not. Oh, the minor stockholder of this enlightened country is an awful sucker. He cannot see the books of his company, and he is treated like a dog if he tries to find out anything. He possibly should feel proud of his magnificent associates, who ride him down with fine, quiet-running automobiles.

So I am going to ask the editor of *Securities* to forget about the trouble of the Bell company. Do not pity it. It is not suffering, and you will have the pleasure of fighting it a long while. The independents should hope for its prosperity, since it removes possibilities of free service and desperate competition. Only pity the minor stockholder in which the puritan conscience and pocketbook are interested.

* * *

Suppose the minor stockholder of the Bell's manufacturing branch should learn for two successive years that $100,000,000 worth of product being sold had not shown profit and then the directors solemnly met, and authorized a bond issue. Suppose you had paid $260 a

share for the stock, and received $8 per share as an annual dividend. Suppose the directors suddenly announced that the business was so dangerously bad off that the parent company had concluded to offer $250 in convertible bonds for the stock, or $225 in cash, if it could not find the convertible bonds. After 30,000 shares had been turned in for a trade, suppose the directors would announce that the issue of manufacturer's bonds was not necessary. Would it not look like a stampede? And suppose 30,000 shares did not trade, and the property is worth $50,000,000, and the parent owned 120,000 of the 150,000 shares, and you could only get $200 for over $300 worth of property, what would be the answer? Ask the puritan conscience. It looks like more pity for the minor stockholder. Again the parent company is not losing.

Suppose there was a boom on the stock market, and the $100 par stock would readily sell at $134 per share. Suppose you issue $150,000,000 par value of convertible bonds, to be converted into your stock at a certain date at that price. Suppose you get $92.50 for your bonds from the syndicate. Would you call this poor financiering? Hardly, when you sell the public $75 worth of value for $100. I would call it clever work. Again I say, do not waste pity upon the old company. She is in no trouble. The Rock of Ages could not be safer.

Praising the old lady or abusing her will make no difference. She asks no favors and gives none. Ask the man who gave his best years to her service. She has burned your hopes in the middle of the street, and would love to do it again. Virtuous and fair, this puritan dame is, with her hand enclosing the same torch that set fire to the innocent maiden and the successful merchants as witches. She needs no pity, and she will give none.

Dear Brother Latzke, you are wrong, this particular time. I usually agree with you, and I often wish you would do like a Kansas editor I knew. He hated one of the citizens, and he would never let his name creep into his paper. There is plenty of room for the independent cause. Teach the young ones to forget the Bell. Public memory is willing to take care of them.

The independent move is really just getting started. Ten years of activity only teaches lessons of experience. After experience comes better care and judgment. The independent telephone interests are just getting into effective action. They are a permanent institution, in spite of the Boston News Bureau and divers licensee sheets.

And the close relation with the banking groups of New York and Boston, what of that? I wish we all had a better relation with these groups—although very few owners of telephone plants would cheerfully go through the ordeal of getting into banking relations with New York and Boston. You have to make concessions and practically part with your heart's desire. It is a great deal like dealing with a pawnbroker. He exacts absolute safety.

The very dream of the editor in question is to have a prominent banker at the head of a telephone company. I will wager that the expression "a prominent banker" appears more than any other. It is all right to get a banker at the head of your company, if he has sense enough to admit that the operating forces have some importance. What is the use of selling securities and being able to borrow money easily if the property is allowed to run down and everything made secondary to banking?

Such management would really be extravagance. So is it extravagance to make your lineman a general manager. I know of an independent company which had such an economical general manager that he ordered the saving of old envelopes for the employees to do their detail figuring. His successor discharged 100 useless employees, used good stationery and paid dividends.

We know why the Kinloch Telephone Company makes use of fewer employees. It has better apparatus than the Missouri Bell. That is my opinion. It takes fewer employees when everything has more efficiency or gives less trouble. Besides, the Kinloch Telephone Company is not old enough to be afflicted with paternalism.

It is a great game.

The Kansas Convention

The Kansas Independent Telephone Association held its tenth annual convention at Topeka March 16 and 17. The address of welcome to the city was delivered by Councilman C. E. Jordan. J. M. Doyle responded.

President W. H. Nelson then addressed the meeting, dwelling upon the importance of independent organization, the problem of farmers' mutual companies and the financing of toll line construction.

Secretary A. B. Clark reported the plotting of a state map of long distance and connecting lines, and suggested their use for advertising the extent of independent long distance lines. He gave the number of telephones connected to long distance lines in Kansas as 134,000. He commented on the increase of construction in Kansas during the year, stating that the drop in prices of cable had induced many companies to change their grounded lines, open lead construction to full metallic cable.

Mr. Clark was followed by J. B. Ware, assistant secretary of the International Independent Telephone Association, who made a short address.

The second day was opened by W. A. Campbell, who discussed the accounts of a telephone system, describing the methods used in the Wichita exchange.

G. H. Peake described the territory covered by the new long distance line in the northern part of the state, calling attention to the excellent methods of construction used.

H. A. White read a paper on "Rural Subscribers—How They Can Best Be Served," stating that these patrons are beginning to appreciate that company management is preferable to a mutual arrangement.

C. J. Myers, in his address on "Necessity of Independent Long Distance Service for Independent Local Companies," urged an equally high standard of efficiency long distance and local lines.

Miss Alice Hummel read a paper on "Service as the Operator Sees It," advocating the cultivation of a well modulated voice for operators.

R. E. Mattison, secretary of the Nebraska State Association, read a paper on "Reasons for Belonging to the State Association." He praised the work of the Nebraska Railroad Commission. He also called attention to the fact that Nebraska is preparing a state telephone directory, to be supplied to every telephone subscriber in the state.

J. B. Ware and Theodore Garey also addressed the convention, on the respective subjects of "The International Association" and "Financing Plants and Toll Lines."

In the election of officers for the ensuing year, William P. Hemphill was made president and A. B. Clark re-elected secretary-treasurer. President Hemp-

hill then appointed H. P. Hemphill, A. B. Clark, C. C. Brown, W. W. Dilworth, H. A. White, W. A. Campbell and J. A. Zimmerman as an executive committee.

The resolutions committee recommended the formation of a financial trust company for the financing of additional toll lines.

The convention closed with a banquet on the evening of the second day, which was largely attended.

Wireless Apparatus for Airships

The latest invention for sending and receiving wireless messages is an outfit small enough to be carried and successfully operated aboard a dirigible airship. Such an apparatus has been perfected by the United States Signal Corps under the direction of Lieutenant Lahm.

Ever since the Marconi wireless method came into existence the United States Signal Corps has kept abreast with the science of transmitting and receiving messages through the air, and some time ago it perfected a wireless apparatus that weighed about two hundred pounds and could be transported on a packmule for field service. This was a great advance over the Morse system, where it was necessary to string wires and then restring them as the army progressed. With the advent of the airship, however, it became necessary to devise some means of wireless telegraphy to be installed on them, if such craft were to be successfully used in time of war. To this end Lieutenant Lahm has been working with all his ingenuity for a long time.

His apparatus had to be made extremely light, for the weight-carrying capacity of the dirigible is limited. Then, too, provisions had to be made to guard against the airship's catching fire from the sparks when the apparatus was in operation; besides, ground wires and receiving poles had to be considered. All of these obstacles were overcome, and the completed wireless outfit for airships weighs only seventy pounds, including the batteries necessary to work it. The whole apparatus is so compact that it occupies only a space as large as a small steamer trunk.

To do away with the danger of the airship's catching fire from sparks, provision was made for confining the sparks in a wooden box and a glass case, so that there is absolutely no danger from that cause. The network of the wires which support the car of the airship, it was discovered, could be quite successfully used as the "ground" wires; and, instead of the very tall pole necessary on ground stations to catch the radiations when messages are sent and received, the simple expedient was adopted of dropping a wire some three hundred feet long from the airship, so that the waves instead of being caught above a station, are caught below. While such an apparatus seems like a mere toy it has a working radius of ten miles.—*Scientific American.*

Stock Exchanges to Use Telephone

With a view of widening the investment field for Ohio securities, Joseph Bonner, president, and C. L. Stacy, secretary of the Toledo Stock Exchange, have presented plans for harmonious working of the various stock exchanges as a unit and using the long-distance telephone for the transmission of prices from one exchange to another.

The plan is to begin with the stock exchanges of Cleveland, Toledo, Columbus and Cincinnati, and ultimately take in all such exchanges, together with a working arrangement with the Indianapolis and Louisville exchanges. A central exchange is to be formed, to be governed by a board of supervisors elected from the several organizations. At a cost of $4,800 a year long-distance telephone communication could be secured, and the local operator at each city would be the representative of the consolidated stock exchange. Quotations of various securities will then be exchanged, with a result that the investment field will be broadened.

Members of the local stock exchange are much interested in the project, and asked many questions as to the details of the plan. A committee will be appointed in a few days to make a close study of the scheme and report.

Telephones in Chicago

According to the annual report of the Chicago Telephone Company more residences are equipped with telephones in Chicago than in any other city in the world. To be exact, there are 85,110 of them. At the close of business December 1 there were in operation in the city 179,366 telephones, a growth during twelve months of 35,302. In addition to the installation work necessary for these new customers the company, under the terms of its ordinance, began a number of large and expensive changes in equipment. One of the biggest changes was from the flat rate telephone, where the subscriber pays a stated sum each year, to the measured rate service. December 1 flat rate telephones had dwindled to 9,736, while 141,296 customers were using the measured rate service. This naturally brings up the contention of the company's representatives, made while the ordinance was being framed, that the flat-rate plan was bad for the service, and in this connection the company says:

"Inspection reports indicate the gradual improvement of service during the year. In spite of the over-use of the flat rate business lines, bringing about congestion of service on such lines nearly every day, the percentage of busy calls has gradually decreased.

"This is because hundreds of important firms have changed from flat-rate lines to private switchboards, operated at measured rates, thus providing a sufficient number of trunk lines to accommodate their business. These changes are constantly going on, but with a continuance of flat-rate business lines a very considerable amount of bad service which cannot be controlled by the company must be forced upon the exchange."

New Exchange Building at Marshalltown

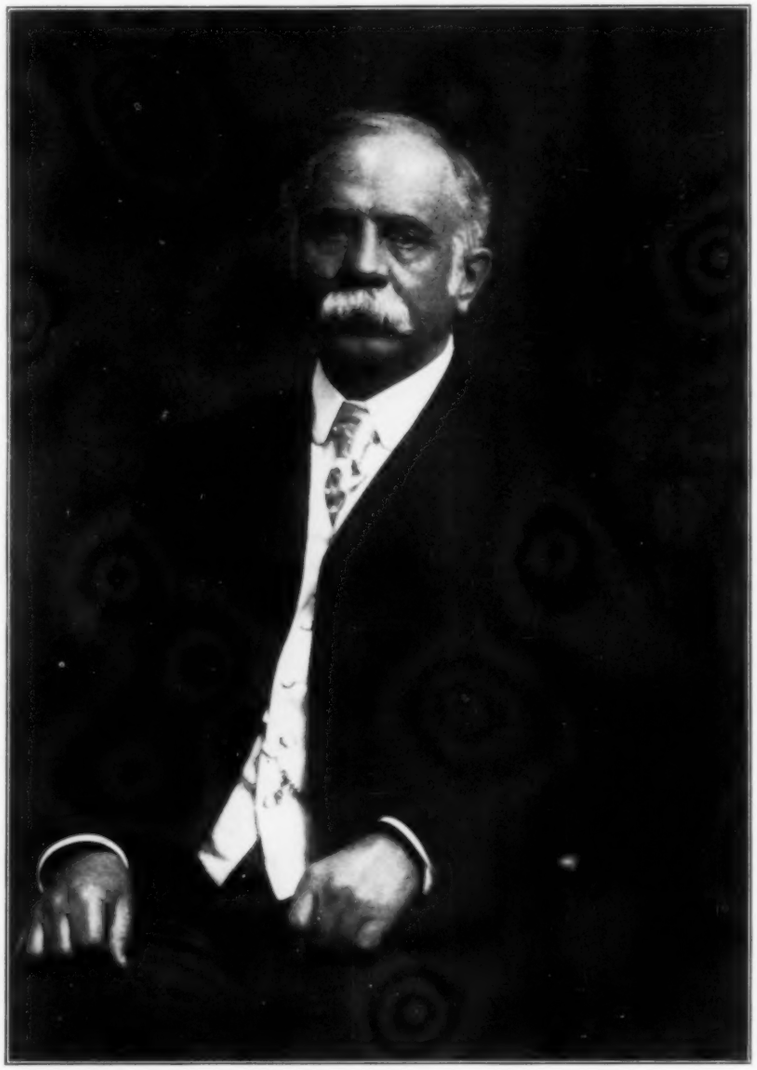
B. F. Cummings, president of the Farmers and Merchants' Telephone Company, which was granted a franchise in Marshalltown, Iowa, some time ago, will erect a new exchange building for the company. Building operations are to be begun as early in the spring as the weather will permit, and, according to Mr. Cummings, the building will cost, completed, not less than $15,000.

Plans for the building have been prepared. The ground dimensions are 30 by 60 feet, and the building is to be two stories in height, with a basement underneath the entire structure. The construction will be thoroughly fireproof—of cement, brick and iron.

The building is to be used for offices, exchange and storage rooms. When finished it will be leased for a long period of years to the company. The interior and furnishings of the building will be modern throughout. One room is to be equipped for a rural exchange for the farmers' lines, which is to be offered free of cost to the rural lines of the county if they desire to use it as a means of entrance into the city.

Who's Who in the Telephone Game

IT is a common tendency to look for the foundation of a man's power in his educational opportunities instead of in his temperament and inheritance. The possession of certain rare qualities in a man invariably emphasize that the springs of genius are purified and directed in their flow by the processes of training, though fed from deeper sources. Fortunate is that individual who is born close to the touch of nature, struggles through the educational institutions of his choice and attains the upper reaches of social and business surroundings. Those lives are worthiest that strike deepest root in the soil of our common life and are yet most responsive to the inspirations that come from the spaces beyond.



The Dean of the Independent Telephone Manufacturers.

About thirty miles from the eastern shore of Lake Ontario, penetrating far into Jefferson County, New York, is the little village of Rodman. It has been the abiding place of some three hundred people for more than a generation. One of the tributaries of Sandy creek skirts the northwestern boundary of the hamlet and nature still preserves an abundance of the richness of her primitive handiwork. The place would not be particularly different to most of us, but its charm is fetching for Milo Gifford Kellogg, who was born there sixty years ago. The common school of that community developed within him a keen desire for a finished education and at twenty-one he graduated from the University of Rochester.

The spirit of the west called him to Chicago in 1870 and he engaged with Messrs. Gray & Barton, manufacturers of electrical devices. Fancy this energetic trio as ambitious young men—Gray and Barton and Kellogg—all experimenting with electricity and making salable apparatus. Elisha Gray—Enos M. Barton—Milo G. Kellogg—makers of telephone history! Here is subject matter for a cyclopedia; and interesting reading, too.

The firm Gray & Barton, in 1872, became the Western Electric Manufacturing Company, and prospered for the ten following years, when in 1882 the word "manufacturing" was dropped from the title. During all these years and until 1885, Mr. Kellogg remained with the concern. For half a decade he was the superintendent of all the details of the manufacturing department.

In 1885, his labors having earned him a rest, and because the fruits of his work had been so satisfactory that he could afford it, he retired from active participation in the company's affairs. For twelve years he was not heard from as a manufacturer. In the meantime he traveled extensively. During the interim he was for two years in Europe. He studied the possibilities of telephone development — he became identified with the operation of telephone plants — he concentrated his knowledge in inventions. During this period he became a fountain head of economical ideas, all pertaining to telephone work. His inventions were numerous — about one hundred and fifty of his patents becoming a large part of the original assets of the new company, which he formed in 1897. The busy test for multiple switchboards is a specimen of the Kellogg invention.

In 1897 the Kellogg Switchbooard & Supply Company was incorporated, Mr. Kellogg becoming its president, a position which he still retains. The Kellogg Company was the first manufacturer to supply independent operating companies with multiple switchboards. It was first, also, to introduce the full lamp signal switchboard to independent operators.

Milo Gifford Kellogg has blazed the way for the independent telephone manufacturer. It was through his personal efforts in 1892 that President Benjamin Harri-

son considered the claims of independent manufacturers with reference to the Berliner transmitter patents. The government's case to annul the validity of Berliner's claim was not successful, but it established the weaknesses which made the subsequent trials a success.

The contribution of largeness to the cause of competitive telephony lies at the door of M. G. Kellogg, the man. His manufacturing organization constitutes the best engineering and sales talent that is to be had. Little could have been added in men, plans or execution to secure greater success. Mr. Kellogg always addresses himself in earnest to the work before him. He surrounded himself with workers of like kind. The integrity and efficiency of the manufactured apparatus resulting from such organization has never been assailed.

During the past five years a separate organization has been maintained in experimental work. What will come from it will shortly be known. It is inferred that the study has been centered about automatic telephone operating and manufacturing. The specializing in an institution apart from the main factory is characteristic of Mr. Kellogg. It is the way of a worthy man and a great inventor—the dean of the independent telephone manufacturers.

Among the Railroads

The replacing of railway telegraph systems by telephones goes merrily on. At the recent meeting of superintendents of telegraph in St. Paul unanimous enthusiasm for the new system was the expression. Attention was called by the secretary of the association to the fact that there are at present 4,900 miles of railroad over which trains are being operated under telephone orders, and that 7,700 additional miles are in construction.

Out west the Great Northern Railroad is installing a telephone system on the Minot division, which extends from Devils Lake to Williston, N. D., a distance of 239 miles. When this is finished the telephone system will be extended from Williston to Cutbank, Mont., over the Montana division, a distance of 437 miles, and also along the Butte division, which covers 507 miles. As the Great Northern is now this will give a grand total of 1,386 miles of line.

The Northern Pacific, which for some time has been dispatching trains by telephone, as well as blocking them in the same manner, for 250 miles is about to put in a telephone blocking system between Trout Creek, Mont., and Spokane, a distance of 125 miles, on its Idaho system. Trains will be dispatched over this division by telegraph, however.

It has been announced that the Union Pacific Railroad will in the near future substitute the telephone for the telegraph instrument in the operation of its trains and the transaction of the regular business over the Plainville and Lincoln branches west of Salina, Kansas.

The Santa Fe is beginning to install over its entire mileage a telephone system for the handling of train orders and other business incident to train movements. The first step is being made at Newton, on the middle division. Before long every office on the main line between Newton and Emporia will be fitted up, and from Emporia to Kansas City over the cut-off the work will be completed.

The Chicago & Northwestern, which has this year equipped its Madison division from Janesville to Baraboo, and the Wisconsin division, from Chicago to Janesville, with train dispatchers' telephone lines, has now completed similar equipment between Baraboo and Winona, Wis. The Northwestern officials have been particularly pleased with the successful working of the system as thus far installed.

On the Canadian Pacific Railway the independent telephone circuit established between Montreal and Farnham has been extended to Newport, Vt., and plans are laid for installation on other circuits during the coming year.

The New York Central has used telephones for train dispatching for some time between Albany and Syracuse. The company is installing apparatus for the extension of the system from Syracuse to Buffalo, about 150 miles.

The Erie Railroad is to use telephones between Meadville, Pa., and Corry.

A Good Telephone Directory

The latest directory of the Johnson County Telephone Company, Iowa City, Iowa, contains nearly 10 pages of helpful advice, comment and instruction to the users of the company's service. The subscriber who reads this matter thoughtfully is sure to profit thereby, and to find telephoning a simpler and more efficient process thereafter.

Some space is given to the history of telephone rates in Iowa City, and the claim is made that patrons of the Johnson County Company's system today get service to over 1,100 city telephones, not to mention as many more rural connections within the trade territory of Iowa City, for half the money paid in former times for less than 100 possible connections. The system was put in operation in January, 1904, on a guarantee basis of 400 subscribers.

Among the admonitions to patrons the following is well worth repeating to every telephone user in the country:

"*Answer immediately* when your telephone bell rings. No one would neglect the ringing of the door bell, and the telephone bell is not only rapidly relegating the door bell to the rear of the social possessions, but it is becoming the most used route to and from the more important places of business everywhere. Therefore the prompt answering of every telephone call is more important than responding to the door bell signal of a social caller or recognizing a customer at the counter.

"*Because* you may be able to recall a disappointed and departing caller or stop the disgusted customer before he gets outside, but when your telephone caller has grown weary of waiting and replaces his receiver on the hook the chances are one hundred to one that you will not be able to find out who it was that rang for you. Also the operator who answers you only answers a fraction of the subscribers and unless the call is from some other one of her particular portion of subscribers and she is able to recognize and recall the voice (if on a party line) there would be no hope of any human intelligence determining who called you."

Telephone and Telegraph in Panama

It is reported that the National Assembly of Panama has recently enacted a law authorizing the executive power to expend a sum approximating $100,000 in the construction of telegraph lines in the Republic of Panama. The law also authorizes the installation of telephone service between several of the towns, and the erection of wireless stations between Colon and Bocas del Toro.

Of Interest to the Trade

New Officers of Kellogg Company

In obedience to the final decree of the Illinois Supreme Court in the case of Francis W. Dunbar et al. v. The American Telephone & Telegraph Company, et al., the said American Telephone and Telegraph Company, on April 20, 1909, restored to its owner each and every certificate of stock of the Kellogg Switchboard & Supply Company, which it had previously attempted to acquire.

On Tuesday, April 27, 1909, the stockholders of the Kellogg company met and elected the following Board of Directors: Milo G. Kellogg, Francis W. Dunbar, Kempster B. Miller, Leroy D. Kellogg, J. B. Edwards, James G. Kellogg and Walace L. DeWolf.

The directors elected the following officers: President, Milo G. Kellogg; vice president, Leroy D. Kellogg; secretary and treasurer, Seymour Guthrie; and the following executive committee: Leroy D. Kellogg, Francis W. Dunbar, and J. B. Edwards.

It is understood that Mr. DeWolf was elected a director by cumulative voting of their shares by himself and a very few other stockholders, who had been in sympathy with his management, and who are entitled to one representative on the Board of Directors.

A New Messenger Splice

Frank B. Cook, Chicago, Ill., has placed on the market a messenger splice which has been tried out in practice and found to be valuable for the uses for which it was designed. Wherever messenger strands can be or need be spliced, the device is applicable without the use of tools. It is claimed that a complete splice can be made by any ordinary lineman within two minutes, and that the splice will be stronger than the strand itself. Ordinarily, if a cable-supporting messenger runs short, it means a splice, and this not

The New Cook Messenger Splice.

only requires time and is expensive, but can only be made by an experienced man. With the Cook splice this operation, it is said, can be performed by anyone. Moreover, in practice, short lengths of strand are either thrown away or consigned to a miscellaneous junk heap for future use. With the splice shown herewith these short lengths of strand can be used up to advantage. These are the principal points of advantage claimed by the manufacturer, the splice also embodying the elements of low cost and reliability.

New Kellogg Bulletins

A folder completely and attractively illustrating a new desk stand has recently been issued by the Kellogg Switchboard & Supply Company, Chicago, Ill. Telephone men now in the market for desk stands will find this brief bulletin (No. 46) interesting. The front and rear views of the stand give an excellent idea of its appearance. Other illustrations show the base with plate removed, and a cross section view of the transmitter and lug. Evidence of the popularity of this new desk stand is given in an illustration of a recent shipment on the way to the packing room.

A bulletin on rural line construction (No. 45) recently issued by the company will prove of interest at this time to telephone men who are interested on the subject. It is carefully illustrated, showing the best practice in setting poles, guying, bracing and wiring; explaining the different wind and other strains, and the importance of careful guying; gives transposition brackets; insulators, arms, arm braces, etc.; tools required in line and telephone work and cost; also the forms and contracts, constitution, by-laws and rules of order generally used by farm companies.

"Quality Telephone Cords" is the title of a carefully and completely illustrated bulletin (No. 47) just issued by the Kellogg company. The illustrations of the cords are very accurate, being halftones made direct from the subject. Each grade and class of cords is given with careful description and price, arranged for the convenience of buyers. The bulletin also shows views of the machines on which the cords are made from the first step to the finished cord, which gives an idea of the size and completeness of equipment of the Kellogg factory. The bulletins will be sent to those interested upon request.

Brookfield Insulators

The Brookfield Glass Company's catalogue of glass insulators for telephone and telegraph lines will be found very interesting to telephone men. Among the many types, which are adapted to every condition and purpose, is listed and illustrated the Barclay improved insulator, a special labor-saving type. The spiral groove on its outer surface is so threaded that when unscrewed from its pin the tie holding the wire is also unscrewed or removed from the insulator. The reverse operation screws the insulator on the pin and at the same time puts the tie wire back in its original position on the insulator.

Western Electric Business Extending

The business of the Western Electric Company for the month of March made a better showing than for any preceding month in the present year, and better than for any month in the previous fiscal year, ended November 30, 1908. The March sales were at the rate of $48,000,000 per year, and the rate for the four months of the fiscal year averaged about $45,000,000 per year. The principal direction of business is in the line of telephone aparatus. There has been steady improvement in such sales, not only to the Bell companies but to outside telephone companies. The sales to independent companies are 50 per cent bigger than at the same time a year ago. The Western Electric Company is still increasing the number of its employees, having added about 2,000 since the beginning of its fiscal year. It is now employing nearly 17,000 persons.

The additions to the Hawthorne plant are being pushed ahead and will be complete this summer. These improvements allow for a considerable expansion for the

telephone end of the company's business. Those in touch with the affairs of the company say that the encouraging improvement in business is not so much due to the launching of new projects or expansion work, as to the recovery of demand to somewhere near normal.

Foreign returns for December and January show a slight increase in comparison with December and January, 1907-1908. The company's business abroad did not suffer during the last two years as did the domestic business, and hence the ratio of improvement is considerably less.

A Harvard Innovation

The Harvard Electric Company, Chicago and New York, is giving free to those jobbers who handle its material a handsome display board showing the popular types of Harvard patent galvanized channel steel brackets.

This board is a very neat and instructive advertising idea and a place for it will doubtless be found on the walls of many of the up-to-date jobbers.

"Between the Poles"

This is the title of a little booklet issued by the Indiana Steel & Wire Company, and it draws a moral on the test of endurance with a description of the man from Marathon, the original "Marathon" runner of ancient Greece, who achieved victory by sheer endurance. Rigid tests of Indiana wire are invited by the manufacturers and the claim is made that the wire will prove its excellence by all tests.

Bell Reported Out of Western Canada

The sale of the Bell Telephone Company's system in Saskatchewan to the government of that province is reported. This announcement is of particular importance, owing to the fact it means the passing of the Bell Telephone Company from the vast tract between the great lakes and the Pacific Ocean.

Although no announcement has been made of the price paid by Saskatchewan, it is said that $240,000 in cash will be handed over by the government, all lines being transferred to the province at midnight April 30.

Manitoba was the first province to purchase the Bell system and Alberta then decided to take over the lines. Saskatchewan's deal followed.

Now government, private and rural companies own all the telephone lines in Canada between the great lakes and the Pacific coast.

A Book on Creosoted Timber

The Norfolk Creosoting Company, Norfolk, Virginia, has issued a little cloth-covered book on "Creosoted Timber, Its Preparation and Uses," which contains information of great value to users of poles, ties, etc. Besides a comprehensive treatise on the subject of its title it contains a large number of useful tables of handy reference. The book is finely illustrated.

The Simplex Wiring Computer

The Simplex Electric Company sends to its friends a pocket device of celluloid for computing wiring. The task is performed simply by rotating a small disc in accordance with the marks on its surface. Size of wire for a given transmission, volts lost, amperes transmitted and distance in feet from source of supply to point of distribution, all are readily determined by following the directions below the disc. On the back is printed a convenient gauge table.

The Simplex manual itself is a very valuable little booklet for workers with wire, containing, as it does, all kinds of wire tables and information. The company's address will be found in the advertising pages.

Michigan Ad Valorem Tax Bill Passed

The Michigan state legislature has passed the Fairbanks bill, changing the system of taxation of telephone companies in that state from the specific to the ad valorem basis. The present tax is three per cent on gross earnings, and the change to a tax on property valuation will add quite a burden to the telephone companies, and the matter will probably be taken into court.

Brevities of the Business.

FRANCHISES ASKED AND GRANTED.

Eureka Springs, Ark.—The city council has granted the Greenwood and Winona Party Telephone Company a 20-year franchise.

Buckeye, Ariz.—T. N. Clanton and H. E. Kell have made application for a telephone franchise.

Needles, Cal.—W. C. Vaughan has applied to the board of supervisors for a franchise for a telephone system to connect Needles and the mining camps with San Bernardino.

Stockley, Del.—A franchise has been granted the Stockley Telephone Company to construct a telephone line.

Bushnell, Ill.—The Buncomb Telephone Company has been granted right of way along the highways of Lamoine township.

Indianapolis, Ind.—The city council recently passed the new franchise of the New Telephone Company and the Indianapolis Telephone Company; granting an extension of several years in the life of the former corporation and permitting an increase in rates.

Jasonville, Ind.—The Farmers' Telephone Company of Howesville has petitioned the city council for a franchise to install a telephone exchange in this city.

Overlook, Kans.—The Burnett Telephone Company has been granted the right of way to construct telephone lines along the roads in Valley Brook township.

Frazee, Minn.—E. F. Gummer and B. Y. McNairy have been granted a franchise to install an exchange in this place.

Graceville, Minn.—The Home Mutual Telephone Company has been granted a franchise in this place.

McIntosh, Minn.—K. O. Bolstad has been granted permission to construct a telephone line in this place.

Union, Mo.—The Meramec Telephone Company has been granted permission to construct telephone lines along the country roads.

Violet, Mo.—The Violet Telephone Company has been granted a franchise.

Brown's Mills, N. J.—The Farmers' Telephone Company has been granted permission to enter the southern section of Hamilton township.

Richmondville, N. Y.—The Farmers' Telephone Company of Summit has been granted a franchise in this village.

Goodrich, N. D.—The Sheridan County Telephone Company has been granted a franchise to operate in Sheridan county.

Kensal, N. D.—The city council has granted L. C. Lane permission to operate telephone lines in this place.

Sentinel Butte, N. D.—The Golden Valley Telephone Company has been granted a franchise in this place.

Wishek, N. D.—F. E. Corson has been granted a franchise to operate a telephone system in this place.

Dufur, Ore.—J. A. Stevens and Waldo Brigham have been granted a franchise to construct a local telephone system.

Mt. Union, Pa.—The common council has granted a franchise to the Standing Stone Telephone Company.

Floresville, Tex.—The Floresville Co-operative Switchboard Association has asked for permission to install a local telephone system.

Manti, Utah.—The Gunnison Telephone Company has been granted a franchise by the county commissioners.

Tacoma, Wash.—The Inland Empire Telephone and Telegraph Company has applied to the county commissioners for a franchise to construct telephone lines connecting Tacoma with a number of small towns.

Centralia, Wash.—W. W. Cannon, C. S. Gilchrist and F. B. Hubbard of this city, J. L. Meyers of South Bend, and H. W. McPhail of Raymond have been granted franchises for the construction of telephone lines in the two latter towns.

Prosser, Wash.—A fifty-year franchise has been granted the White Bluffs and Columbia River Telephone Company.

PERSONAL NOTES.

Harry C. Slemin, who has held the position of advertising manager of the Stromberg-Carlson Telephone Manufacturing Company, Rochester, New York, since February, 1907, has been promoted to the combined post of sales and advertising manager of the company. Before being appointed advertising manager Mr. Slemin had charge of various other lines of work in the Stromberg-Carlson plant, including its cable business. He left the Chicago manual training school in 1896, taking a position with the Western Electric Company. Here he secured practical experience in various departments of the works, going from the shop into the drafting department, where he worked for a considerable time. He then entered the apparatus engineering department. Three years later he was transferred to the engineering sales department, where he remaind for a year and a half, until he took charge of the Stromberg-Carlson Company's apparatus engineering department in 1904. His record with that concern has been an enviable one, and the considerable extensions of business which have been accomplished by the company since that time are due in no small part to his ability and enterprise. Mr. Slemin is very well known to the trade, and his many friends will be glad to hear of his latest upward step in the telephone world.

Milo G. Kellogg was elected president of the Kellogg Switchboard & Supply Company at the directors' meeting held April 27. Leroy D. Kellogg was made vice-president and Seymour Guthrie secretary and treasurer. The executive committee is comprised by L. D. Kellogg, F. W. Dunbar and J. B. Edwards.

Edward S. Myers has been appointed manager of the Central Union Telephone Company's exchange at Upper Sandusky, Ohio.

W. N. Cash, Menominee, Wis., has been appointed manager of the Wisconsin Telephone Company's exchange at Eau Claire, Wis.

J. S. Kenison has been appointed manager of the People's Telephone Company, Madrid, Iowa.

George Blakely, Crookston, Minn., has been promoted to the managership of the Northwestern Telephone Company for South Dakota, with headquarters at Sioux Falls.

James Martin, Kewanee, Ill., has assumed charge of the Farmers' Telephone Company, Viola, Ill.

Nolan P. Ziegler has been appointed manager of the Central Union Telephone Company's exchange at Mishawaka, Ind.

Glenn Stevens has been elected manager of the Farmers' Home Telephone Company, Shelton, Neb.

O. C. Sundquist has been appointed local manager of the Michigan State Telephone Company, Escanaba, Mich.

E. J. Holihan, formerly local manager of the Michigan State Telephone Company at Owasso, has been promoted to the office of district manager, with headquarters at Lansing. W. J. Allen succeeds Mr. Holihan at Owosso.

Rudolph Ellis, of the Fidelity Trust Company, Philadelphia, has been elected a director of the American Telephone and Telegraph Company, to succeed H. H. Brigham.

Francis C. Runnels, under whose supervision the first railroad telephone system was installed between Aurora and Mendota, and tested, has resigned his position as trainmaster of the Dwight division of the Chicago & Alton railroad. It is stated Mr. Runnels is considering an offer to supervise the installation of a telephone system on one of the largest trunk lines in the country.

Alfred Anderson has been appointed manager of the Assaria Telephone Company, Assaria, Kans.

James Rogers, Earlville, Iowa, has been appointed superintendent of the Inter-State Telephone Company, Dyersville, Iowa.

Harry Pond has been placed in charge of the Branford division of the Hudson River Telephone Company, Banford, N. Y.

F. H. Boyer, Page, Neb. has accepted the managership of the Nebraska Telephone Company's Exchange at Elk Creek, Neb.

CONVENTIONS.

The Arkansas Independent Telephone Association will hold its convention at Little Rock, May 10 and 11.

The Indiana Independent Telephone Association will hold its fourth annual convention at Indianapolis, May 12 and 13.

The Missouri Independent Telephone Association will hold its annual convention at Kansas City, May 19 and 20.

The West Virginia Independent Telephone Association's convention will be held at Parkersburg, May 27 and 28.

NEW TELEPHONE COMPANIES.

EUREKA SPRINGS, ARK.—The Greenwood and Winona Party Telephone Company has been organized with the following officers: President, James Hull; secretary-treasurer, George Russ.

TULARE, CAL.—Articles of incorporation have been filed for the Tulare Home Telephone and Telegraph Company, with a capital stock of $25,000. Directors, G. C. Harris, B. W. Chenowith, Scott Hendricks and Thomas J. Franklin, San Francisco.

SAN LUIS OBISPO, CAL.—The Adelaide Rural Telephone Company has been incorporated by Otto Wyss, A. A. Dubois, W. I. Davis and others.

CHINO, CAL.—The San Gabriel Telephone Company has been incorporated with a capital stock of $200,000. Directors, H. F. Metcalf and Egar O. Fawcett, Pasadena; H. V. Carter, Los Angeles; E. E. Bailey and W. M. Northrup, Alhambra.

ALHAMBRA, CAL.—Articles of incorporation have been filed changing the principal place of business of the Alhambra Home Telephone and Telegraph Company from Alhambra to Chino. The capital stock is $50,000 and the incorporators are: P. F. Spencer, G. G. Miller, L. R. Parks, and E. C. Webster, of Los Angeles, and L. E. Williams, of Alhambra.

SEDALIA, COLO.—The Sedalia Telephone Company has been incorporated with a capital stock of $10,000. The directors are: Fred Kingsley, Elmer O. Black and Alfred Stewart.

MOUNTAIN VIEW, COLO.—The Mountain View Telephone Company has been organized with the following officers: President, Bradford Hale; vice-president, J. W. Baker; secretary, F. S. Turner.

GAINESVILLE, GA.—The Bridge Telephone Company has been organized with Claude L. Thompson as president and W. L. Awtry secretary-treasurer.

MT. VERNON, GA.—The Mt. Vernon Telephone Company has been organized. Among those interested are: L. L. Jennings, G. W. Dodson, C. P. McGuire, I. L. McClure, L. Terry, J. I. Terry.

BOSTWICK, GA.—Articles of incorporation have been filed for the Bostwick Telephone Company, with a capital stock of $2,500. The incorporators are: John Bostwick, A. O. Nunnally, James M. Preston and others.

HULL, GA.—The Free State Telephone Company has been incorporated with a capital stock of $500 by J. C. Coile, W. F. Matthews, B. B. Chandler and others.

GLASGOW, KY.—W. G. Harris and others have organized the Rocky Hill and Beckton Telephone Company, with a capital stock of $500.

HALL, KY.—The Lower Beaver Creek Telephone Company has been organized by John Hall and others.

MUD LICK, KY.—W. F. Tacket, John Tacket and others have organized the Mud Lick Telephone Company with a capital stock of $2,000.

PUTNEY BEND, KY.—The Putney Bend Telephone Company has been incorporated with a capital stock of $200 by W. E. Robinson, A. T. Ham, W. T. Woolfolk and others.

NEW LIBERTY, KY.—The Ragland Telephone Company has been incorporated with a capital stock of $2,000. The officers are as follows: President, M. B. Tapp; vice-president, W. H. Cunningham, both of Woodville; secretary-treasurer, T. E. Martin, Rossington.

BUXTON, KANS.—The Buxton Telephone Company has been incorporated with a capital stock of $1,250. The incorporators are Andrew Neese, J. E. Chestnut and others.

BIGELOW, KANS.—The Bigelow Mutual Telephone Company has been organized with the following officers: President, W. Tilley; vice-president Charles Jones; secretary, J. L. Wilkin; treasurer, T. A. McCandless.

HALLS SUMMIT, KANS.—The Farmers' Co-operative Telephone Company has been incorporated by T. H. Morse and E. B. Carr, of Lebo, Kans.

FLETCHER, KANS.—Articles of incorporation have been filed for the Fletcher Telephone Company, with a capital stock of $10,000. Directors, R. C. Stout, W. E. Nix, J. L. Peden.

OSBORNE, KANS.—The Osborne Telephone Company has been organized with the following officers: President, L. F. Storer, Portis; vice-president, William Roadhouse, Portis; treasurer, W. F. Bell, Portis; secretary, F. P. Wells.

LAMAR, KANS.—The Lamar Rural Telephone Association has been chartered with a capital stock of $1,400, by D. R. Hardesty, J. W. Bain and others.

VIDETTE, KANS.—Articles of incorporation have been filed for the Auburn and Vidette Telephone Company. Capital stock $12,000. The incorporators are J. E. Mans of Topeka and P. W. Bundy, Route 25, Auburn, Kans.

SOUTH PARIS, MAINE.—The Citizens' Telephone Company has been organized with a capital stock of $5,000. The officers are: President, Walter L. Gray; treasurer, Charles W. Bowker.

BALDWYN, MASS.—The Baldwyn Home Telephone Company has been organized. Among those interested are D. F. Eastman, manager of the Booneville Telephone Company, and J. C. McCarthy, manager of the Guntown Telephone Company.

GALESBURG, MICH.—The Citizens' Telephone Company has been organized at this place. Among those interested are W. S. Lawrence and Sidney Morton.

BIG RAPIDS, MICH.—The Hinton Mutual Telephone Company has been incorporated with a capital stock of $7,500. The incorporators are Geo. Johnson, D. E. Robinson, Wilson Luxon and others.

NORTHVILLE, MICH.—The Inter-County Telephone Company has been incorporated with a capital stock of $5,000. The directors are Clement C. Yerkes, Louis A. Babbitt and others.

CHAPIN, MICH.—Articles of incorporation have been filed for the Farmers' Mutual Telephone Company. Capital stock $10,000.

POTLATCH, IDAHO.—Articles of incorporation have been filed with the secretary of state for the Potlatch Farmers' Telephone Company, with a capital stock of $1,000, by Byron E. Triper, E. C. McGuire and others.

FRUITLAND, IDAHO.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $10,000. The directors are: B. F. Tussing, A. Grimes, L. H. Rich and others.

OTTAWA, ILL.—The United Telephone Company has been incorporated with a capital stock of $122,000. The incorporators are Al F. Schoch, Henry W. Johnson, Vincent J. Duncan.

PERU, ILL.—The Cedar Point Telephone Company has been incorporated with a capital stock of $1,100 by Ellmore H. Whitaker, Robert H. Johnston and John Martens.

PALMYRA, IND.—The Flat Woods Independent Telephone Company has been incorporated to operate in Harrison, Floyd, Washington and Clark counties. The directors are: M. A. Smith, Lawrence Ellis and others.

CELESTINE, IND.—The New Home Telephone Company has been incorporated with a capital stock of $500. The directors are: B. Nordhoff, George W. Iacobs, L. L. Jacobs.

KENNARD, IND.—The Kennard Independent Telephone Company has been organized.

INGALLS, IND.—Articles of incorporation have been filed for the Fall Creek Telephone Company, with the following directors: Geo. W. Pettigrew, Charles Heday and others.

BRIGHTON, IND.—The Pretty Prairie Telephone Company has been incorporated with a capital stock of $14,000. Directors, F. G. Smeltzly, H. C. Plank and others.

ROSEDALE, IND.—The Rosedale Telephone Company has been granted articles of incorporation, with the following directors: Fred Wimmer, J. A. Taylor, George W. Rukes.

COMO, IND.—The Como Telephone Company has been incorporated with a capital stock of $10,000 for the purpose of operating throughout Jay, Wells and Randoloh counties.

LAWRENCE, IND.—The Grassy Creek Mutual Telephone Company has been incorporated with a capital stock of $2,500 to operate in Marion and Hancock counties. The directors are B. F. Whitesides, John C. Roab and J. B. Mithoefer.

IOWA FALLS, IOWA.—The Iowa Falls and Owasa Telephone Company has been incorporated with the following directors: J. M. Rankin, John Robertson, Joseph Brewster and others. Capital stock $2,450.

EDGEWOOD, IOWA.—The Edgewood Farmers' Telephone Company has been incorporated by J. A. Stone, J. S. Waite and others. Capital stock $2,000.

BLAIRSBURG, IOWA.—The Cedar View Telephone Company has been organized. The officers are as follows: President, G. W. Coleman; treasurer, P. C. Stone; secretary, H. L. Doty.

WYOMING, IOWA.—Articles of incorporation have been filed for the Tracy Telephone Company, with a capital stock of $900. Directors, J. S. M. Crillis, G. W. Harney and others.

CLEGHORN, IOWA.—Articles of incorporation have been granted the Cleghorn Independent Telephone Company. Capital stock $1,000.

CLERMONT, IOWA.—The Gunder and Clermont Telephone Company has been incorporated with a capital stock of $4,000. The officers are: President, H. S. Croth; vice-president, A. O. Olson; secretary-treasurer, G. L. Ostlie.

HAZLETON, IOWA.—The Otter Creek Telephone Company has incorporated under the name of the Hazleton Farmers' Telephone Company, with the following officers: President and general manager, D. N. King; vice-president, J. D. Allen; secretary, E. J. Short; treasurer, George Nibeck.

WYOMING, IOWA.—The Wyoming Telephone Company has been incorporated by Otto Wettstein, Jr., W. D. Waggoner and J. J. Luneman, with a capital stock of $30,000.

MARSHALLTOWN, IOWA.—The Air Line Telephone Company has been organized with the following officers: President, C. D. Berogan; vice-president, C. F. Brown; secretary, Irving Lasher; treasurer, John Butler.

HARRISVILLE, MICH.—The Citizens' Telephone Company has been incorporated with a capital stock of $3,000. The officers are as follows: President, W. L. Chappelle; vice-president, W. D. Mitchell; secretary, S. B. Kahn; treasurer, John McGregor.

CARRS, MICH.—The Carrs Telephone Company has been incorporated with a capital stock of $575. The officers are: President, W. L. Ingalls; vice-president, W. L. Sanders; secretary, J. B. Bauman; treasurer, W. S. Charon.

VANDALIA, MICH.—The Birch Lake Telephone Company has been incorporated with a capital stock of $30,000.

SUNFIELD, MICH.—The Sunfield Co-operative Telephone Company has been organized with the following officers: President, Charles M. Ralston; secretary, W. E. McClelland; treasurer, C. N. Town.

ITHACA, MICH.—The St. Charles Roadway Telephone Company has been organized and connection will be made with the Union Telephone Company in this place. The capital stock is $1,500 and the officers are: President, Chas. H. Reeves; secretary, William Schaub; treasurer, Eugene Reeves.

SPRINGVALE, MICH.—Articles of incorporation have been granted the Springvale Telephone Company. Capital stock $1,800.

NEW BALTIMORE, MICH.—The Anchorville Bay Telephone Company has been organized with the following officers: President, H. J. Knopf; secretary, A. J. Christy; treasurer, H. M. La Bounty.

TWINING, MICH.—The Twining Mutual Telephone Company has been organized with the following officers: President, C. J. Shreeve; vice-president, G. H. Hollister; secretary, W. H. Townsend; treasurer, John J. Finerty. Capital stock $5,000.

HOWARD CITY, MICH.—The Ensley and Oak Grove Farmers' Telephone Company has been organized with the following officers: President, F. S. Hillman; secretary, James Kinney; treasurer, James Hanse.

AITKIN, MINN.—Articles of incorporation have been filed for the Aitkin Telephone Company. Capital stock $24,000. The incorporators are: Herman Moork and F. M. Shook of Aitkin, and C. P. De Laittre and J. L. De Laittre of Minneapolis.

WEST CONCORD, MINN.—The West Concord Telephone Company has been incorporated with a capital stock of $15,000, by W. T. Schmidt, F. F. Clifford and others.

BRUSHVALE, MINN.—The Brushvale Farmers' Telephone Company has been incorporated by John Holecek, Henry Lordeman and others. Capital stock $10,000.

THIEF RIVER FALLS, MINN.—The Eastern Marshall-Red Lake Farmers' Telephone Company has been incorporated.

CLYDE, MINN.—The Farmers' Telephone Company has been incorporated with a capital stock of $400 by George Gilbertson, James E. Moore and Frank Baker.

FAIRFAX, MINN.—The Russia-Fairfax Telephone Company has been organized with the following officers: President, B. Hinton; vice-president, Seivert Qualbert; secretary, O. Sanness; treasurer, E. Durdahl.

PINE RIVER, MINN.—The Pine River Telephone Company has been incorporated with a capital stock of $10,000. Charles W. Ladu is secretary of the company.

ODESSA, MINN.—The Odessa-Correll Farmers' Telephone Company has been organized by L. R. Gerber, Peter Storm, Lars Bobak, and others.

HEINOLA, MINN.—The Heinola Telephone Company has been organized with the following officers: President, J. P. Aarni; vice-president, M. H. Korkala; secretary, John Carlund; treasurer P. O. Rahto.

NEW SCANDIA, MINN.—The Scandia Marine Telephone Company has been incorporated with a capital stock of $12,000. The incorporators are: A. P. Young, J. A. Hawkinson, and others.

PILOT GROVE, MO.—The Enterprise Telephone Company has been incorporated with a capital stock of $15,000, and the officers are as follows: President, H. H. Simpson; secretary-treasurer, C. H. Ross.

MCLEOD, MONT.—The Maine-Boulder Telephone Company has been incorporated with a capital stock of $2,000.

HUSON, MONT.—Articles of incorporation have been filed for the Huson Creek Telephone Company; capital stock $5,000.

CORTLAND, NEB.—The Highland Telephone Company has been incorporated; capital stock $21,000. The officers are as follows: President, M. M. Stanley; vice-president, Thomas Sargent; secretary, T. W. Sargent; treasurer, J. P. Clough.

O'NEILL, NEB.—The Michigan Telephone Company has been organized and the officers are as follows: President, M. P. Sullivan; vice-president, J. D. Kelley; secretary, P. C. Kelley; treasurer, Jacob Hirsch.

BRUNING, NEB.—The Bruning Home Telephone Company has been organized with a capital stock of $15,000. The officers are: President, J. H. Casper; vice-president, H. R. Park; secretary-treasurer, W. H. Grone.

KEARNEY, NEB.—Articles of incorporation have been filed for the Union Valley Telephone Company with a capital stock of $5,000. The incorporators are Patrick Fitzgerald, George Bischel and others.

STAFFORD, NEB.—Articles of incorporation have been filed for the Highline Mutual Telephone Company by I. K. Asford, Charles Hopper, and others.

JERSEY CITY, N. J.—The Telepost Company of New Jersey has been incorporated with a capital stock of $10,000, by H. L. Sellers, T. Conyngton, and others.

VINELAND, N. J.—Articles of incorporation have been filed with the secretary of state for the South Jersey Rural Telegraph and Telephone Company; capital stock $25,000. The incorporators are: Frank Macomber, A. H. Wilson, Cuno Becker.

STANLEY, N. M.—The Stanley Telephone Company has been organized; capital stock 6,000, and officers as follows: President, general manager and treasurer, J. H. Darnell; vice-president, J. O. Leatherwood; secretary, W. C. Scoval.

KNOWLES, N. M.—Articles of incorporation have been filed for the Knowles-Monument Telephone Company. Capital stock $10,000, and the incorporators are: J. L. Emerson, W. U. Dannelley, and H. F. Christian, of Calsbad.

ALTON, N. H.—The Home Telephone Company has been incorporated with a capital stock of $5,000.

ELY, NEV.—The Spring Valley Telephone Company has been incorporated by Henry C. Nicholson, Joseph E. Stevens, and Eugene Giles.

WHALLONSBURG, N. Y.—The Essex and Whallonsburg Telephone Company has been incorporated by C. W. Sherman, P. N. Stafford, and others, with a capital stock of $2,000.

CORNWALLVILLE, N. Y.—The Motchell Hollow and Cornwallville Telephone Company has been incorporated with the following directors: H. B. Maben, Roscoe Howard, John Barlow of Windham, and Elisha N. Parks of Cornwallville; capital stock $2,000.

WALES, N. D.—The Wales-Moscow Co-operative Telephone Company has been incorporated with a capital stock of $3,000, and the officers are as follows: President, Ole Oldmansen; vice-president, George H. Johnston; secretary, Edward Hill; treasurer, C. G. Getchell.

ANAMOOSE, N. D.—The Bloomington Valley and Lincoln Telephone Company has been organized with John Weitz, Jr., president.

MCCLUSKY, N. D.—The Lamont Telephone Company has been incorporated by Emanuel J. Klundt, Denhoff, N. D.; Jacob Triebwasser, and John H. Regier, of McClusky, and others. Capital stock, $4,000.

JEROME, N. D.—The Southwest Telephone Company has been incorporated by D. M. Glasgow, and others.

BOSTONIA, N. D.—The Kidder County Telephone Company has been organized. V. Stranblad is secretary of the company.

BROFY, N. D.—The Emmons County Telephone Company has been organized with C. A. Ward, president, and William Foell, secretary; capital stock $4,000.

HOMESTEAD, N. D.—The Wyndmere and Homestead Farmers' Telephone Company has been organized with N. C. Jensen, president, and G. O. Sandem, secretary.

MARYSVILLE, O.—The Farmers' Telephone Company has been organized with the following officers: President, J. D. Coe; vice-president; C. W. Vanhiney; secretary, W. N. Plotner; treasurer, W. N. Thomas.

ATWATER, O.—The Atwater Telephone Company has been incorporated with a capital stock of $10,000 by W. E. Craig, and others.

CHARDON CENTER, O.—The Chardon Citizens' Telephone Company has been organized with the following officers: President, H. S. Knapp; secretary, C. W. Hudson; treasurer, R. M. Stafford.

ISLE ST. GEORGE, O.—The North Bass Telephone Company has been organized with W. D. Smith, president, and Lawrence Reichel, secretary.

CAREY, O.—The Carey Farmers' Telephone Company has been incorporated with a capital stock of $10,000, by E. F. Hoy, and others.

RESACA, O.—The Resaca Farmers' Telephone Company has been incorporated with a capital stock of $10,000, by W. R. Bigelow, and others.

WHARTON, O.—Articles of incorporation have been filed by the Wharton Telephone Company; capital stock $10,000, and the incorporators are C. M. Wickiser, N. Wickiser, and others.

BRIDGEPORT, OKLA.—The Waconda and Mound Telephone Company has been incorporated with a capital stock of $1,500, by J. A. Cox, T. C. Walker and C. Karlin of Bridgeport, and W. H. Fossett of Hinton.

DOXEY, OKLA.—The Beulah Union Telephone Company has been incorporated with a capital stock of $5,000, with Frank T. Alexander as manager.

KANSAS, OKLA.—The Delaware Central Telephone Company has been organized with a capital stock of $500. The directors are D. A. Smith, W. J. Holbrooks, and J. R. Terry.

WHEATLAND, OKLA.—The Davis Brothers Telephone Company has been incorporated. The capital stock is $500, and the directors are: Jesse P. Davis, A. D. Davis, and Myrtle Davis.

LACY, OKLA.—Articles of incorporation have been filed for the Lacy and Western Telephone Company; capital stock $3,000. The directors are: T. E. Willis, W. S. Kinnet, and J. D. Patton of Hennessey.

HOBART, OKLA.—A charter has been granted the Southern Rural Telephone Company. The capital stock is $375, and the directors are as follows: Chas. W. Nailer, J. M. Humbert, and others.

MINCO, OKLA.—The Consolidated Telephone Company has been incorporated by F. G. Dennis, of Mustang; R. L. Bristow, and A. C. Bristow of Minco; capital stock $5,000.

GIBSON, OKLA.—A charter has been granted the Sims-Renner Telephone Company; capital stock $5,000. Incorporators: J. W. Sims, Gibson; W. A. Renner, and J. H. Renner, Looney.

DAMASCUS, ORE.—The Damascus Mutual Telephone Company has been organized with a capital stock of $5,000.

GREENTOWN, PA.—The Cresco and Greentown Telephone Company has been organized with a capital stock of $5,000. Stewart Shively is treasurer.

BEDFORD, PA.—S. F. Whetstone, S. T. Diehl, Samuel Hunt, and others have made application for a charter for the Frinds Cove Telephone Company.

CORYVILLE, PA.—The Grange Telephone Association has been formed by the farmers of this vicinity.

BROWNTOWN, PA.—The Browntown Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are Fred A. Burr, Ezra Maxwell and others.

YOUNGSVILLE, PA.—The Brokenstraw and Stillwater Telephone and Telegraph Company has been incorporated with a capital stock of $25,000. John A. Gay is treasurer of the company.

MERCER, PA.—The Osgood Telephone Company has been organized with the following officers: President, Henry Green; secretary, Thomas Barrows.

NORTH EAST, PA.—The North East Telephone Company has been organized with the following officers: President, E. A. Orton; secretary, G. C. Graham; treasurer, W. F. McCord. Capital stock, $20,000.

LEBANON, PA.—Application has been made for a charter for the Ona and Lebanon Rural Telephone Company.

DOWELLTOWN, TENN.—The Dowelltown Home Telephone Company has been incorporated with a capital stock of $3,000. The incorporators are: B. W. Robinson, James Davenport, and others.

JACKSON, TENN.—The Farmers' Telephone Company has been incorporated by William Arnold, J. F. Ward, and others, with a capital stock of $1,000.

PLEASANT SHADE, TENN.—Articles of incorporation have been filed for the Pleasant Shade Mutual Telephone Company with a capital stock of $1,000. The incorporators are: G. W. McDonald, G. W. Cornwell, and others.

SMITHVILLE, TENN.—The Temperance Hall Home Telephone Company has been incorporated. The capital stock is $1,000, and the officers are as follows: President, R. S. Reynolds; vice-president, J. H. Sykes; secretary, J. F. Turner; treasurer, J. H. Close.